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NORTHERN PLAINS COLLEGE OF VETERINARY MEDICINE

A FEASIBILITY STUDY

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NORTHERN PLAINS COLLEGE OF VETERINARY MEDICINE

A FEASIBILITY STUDY

PREPARED FOR:
THE OLD WEST COMMISSION
BY
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The Old West Region Commission is a Federal-State partnership designed to solve regional economic problems and stimulate orderly economic growth in the states of Montana, Nebraska, North Dakota, South Dakota and Wyoming. Established in 1972 under the Public Works and Economic Development Act of 1965, it is one of seven identical Commissions throughout the country engaged in formulating and carrying out coordinated action plans for regional economic development.

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FOREWORD

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CHAPTER I

OBJECTIVES AND BASIC ASSUMPTIONS

Introduction and Background

There is no college of veterinary medicine in the Old West Region comprised of the states of Montana, Nebraska, North Dakota, South Dakota, and Wyoming. A report, entitled Assessment of the Need for a College of Veterinary Medicine in the Old West Region by C. R. Cole, L. D. Knezek, and V. B. Toran concluded that the Old West Region has an unequivocal need for a college of veterinary medicine (1).* The Region has a rapidly increasing demand for veterinary medical services. The study identified 25 factors related to the demand for veterinary services and developed a model for projecting the demand for veterinarians. If the Region does not establish a college of veterinary medicine (CVM), the shortage of veterinarians was estimated at 254 in 1980, 573 in 1985, and 1,028 in 1990. Concurrently with the increasing demand for veterinary medical services, there is a large and growing number of young people who want to become veterinarians. The number of preveterinary students in the Region's universities was 646 in 1974 and is estimated at 869 in 1980 and nearly 1,000 in 1990. If the Region does not open a CVM, few students will achieve their goal because veterinary colleges outside of the Region cannot accommodate over 88 percent of the applications from the Region in 1974; over 95 percent is expected to be refused in 1975.

Aggregate benefits of a CVM to the Region from research, animal patient referral service, diagnostic service, and residency, intern, and continuing education are substantially as important to the Region as the Doctor of Veterinary Medicine (DVM) educational program. Research, estimated by the study to increase the farm and ranch cash receipts in the Region by $128,000,000 annually, is of itself justification for establishing an Old West CVM.

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*References appear at the end of each chapter.

In response to the magnitude and diversity of the above demands, the four following alternatives for fulfilling those demands were evaluated: a) continue efforts to recruit out-of-state and foreign veterinarians, b) continue efforts to contract for services of a CVM, c) share a veterinary medical curriculum with one or more colleges outside of the Region, and d) establish a college of veterinary medicine in the Region to serve the five states.

Recruitment of out-of-state and foreign veterinarians as the sole supply, in lieu of providing an educational opportunity in veterinary medicine, was eliminated from further consideration because there is a growing national shortage of veterinarians expected to reach nearly 4,000 by 1980. The contract approach, tried by the five states in the past, is not feasible for fulfilling the need because veterinary colleges outside of the Region are operating at full or excessive capacity. States which have colleges are reserving all or a larger portion of student spaces for residents. Services such as continuing education, patient referral, and research cannot feasibly be contracted for outside of the Region. The shared curriculum approach was judged impracticable because CVM's contiguous with the Region have large classes and are located too great a distance from the geographic center of the Old West Region.

Evaluation of the above alternative approaches led to the conclusion that a new CVM is the only viable, long-range solution to the Region's need. The most significant advantages which will accrue to the Old West Region if it establishes a CVM were identified as follows:

1. A long-range solution to all the Region's demands for veterinary services and need for educational opportunity in veterinary medicine for its young people is reasonably assured.

2. Full services of education, research, and service are available to each state at minimum cost.

3. Full control of programs and budgets is vested in the participating states.

4. Retention of young college graduates in the Region is favored because the need to send students out for veterinary education is eliminated; and generally more veterinarians practice in the Region where they receive their education.

5. A supply of veterinarians which can be adjusted to fulfill the demand of each state is reasonably assured.

6. An equitable share of spaces for students from each state in the Old West Region is reasonably assured.

7. Benefits to the economic climate of the Region are as follows:

    a) Provides the Region with research, continuing education, diagnostic and animal referral services, and graduates essential for alleviating the more than $856,000,000 annual loss in potential farm cash receipts attributable to animal diseases.

    b) Protects the Region's investment in animals--veterinary medical research alone is estimated to increase the farm and ranch income from livestock products by over $128,000,000 annually.

c) Provides opportunity for new industries to develop from spin-off of biomedical and environmental research.

d) Attracts federal, foundation, and industrial funds to the Region which can account for up to half of the annual operating budget for the regional college.

8. The level of professional services including consumer protection and public health will be elevated.

9. Departments of veterinary science and medical schools in the Region will benefit through collaboration and scientific interchange with a regional CVM.

The report identified the training programs for animal technicians in the Region and assessed the current and future demand and supply of those paraprofessional personnel. The study concluded that if the Region establishes a CVM, the college should not initiate a new animal technician program. The supply of technicians provided by present training programs is estimated to equal the demand in 1978 and exceed the demand in 1979. Although the veterinary medical profession continues to utilize animal technicians up to economic limits, there is no indication that technicians are employed in lieu of veterinarians.

Data presented in the report supported the following recommendations concerning the need for a regional CVM:

1. In view of the magnitude and perpetual nature of the demand for veterinary medical services in the five-state Region, the study recommended the establishment of a college of veterinary medicine as the long-range solution to the needs of the Old West Region.

2. During the interim of about five years, until an Old West CVM is opened, it was recommended that the Region continue efforts

to contract for student spaces to the extent that spaces are available in veterinary colleges adjacent to the Region.

3. As a service to the states and in the interest of developing economic and human resources in the Region, the study recommended that the Old West Regional Commission promptly undertake a study to determine the feasibility of establishing a college of veterinary medicine to serve the five cooperating states.

OBJECTIVES

Upon completion of the "need study" summarized above, the Old West Regional Commission (OWRC) appointed a Veterinary College Advisory Board (consisting of two people from each of the five states in the Region plus a distinguished veterinary educator outside of the Region) to evaluate the report and render advice concerning future courses of action. Members of the Board are listed under the acknowledgment section at the front of this report.

On April 15, 1975, the Old West Regional Commission recognized the magnitude of the need for a CVM, approved the "need study", and authorized the present study entitled "Feasibility of a Northern Plains College of Veterinary Medicine."

Briefly stated, the primary objective is to collect, analyze, and interpret data which will provide the basis for determining whether or not it is practicable for one or more universities in the Region to establish and operate a CVM to serve all five cooperating states. Full consideration will be given to logistical and financial parameters.

Specific objectives include determination of:

1. Programs of education, research, and public service designed uniquely to fulfill the specific needs of the Old West Region;
2. Provide institutional data on the number of students and faculty in the regional college;
3. An equitable formula for utilization of the college by the five states;
4. The optimal location for the nucleus of the regional college of veterinary medicine based upon objective evaluation of alternate locations;
5. Appropriate organization of veterinary programs among the universities;
6. A plan for governance and administration;
7. Sources of capital and operating funds other than state appropriations;
8. Space requirements and capital costs giving consideration to maximal utilization of existing university facilities;
9. Operating costs;
10. An equitable formula for participation of each cooperating state in funding the college; and
11. Recommendations based upon the above data.

BASIC ASSUMPTIONS

The investigators in concert with advice of the OWRC Veterinary College Advisory Board agreed that the study should be predicated upon several assumptions concerning the proposed college. The regional CVM should possess the following features:

1. High scientific and professional quality which exceeds the minimum requirements for accreditation;
2. Programs of education, research, and public service which are relevant to the regional needs;
3. An innovative curriculum designed to make use of existing veterinary science departments and industrial, governmental, and private resources (such as libraries, laboratories, equipment, and personnel) in the five states;
4. Capital and operating costs adequate for maintaining high educational standards and appropriate physical facilities;
5. An organization designed to include equitable representation from the five cooperating universities;
6. An admission policy giving first priority to residents of the Region; and
7. A close working relationship with the animal industries, state veterinary medical associations, and veterinarians in the Region.

REFERENCE

1. Cole, C.R., L.D. Knezek, and V.B. Toran, Assessment of the Need for a College of Veterinary Medicine in the Old West Region, Old West Regional Commission, Rapid City, South Dakota, 1975.

CHAPTER 2

PROGRAMS OF EDUCATION, RESEARCH AND PUBLIC SERVICE

Multiple activities of education, research and public service are essential and interrelated ingredients comprising the educational environment. These three elements benefit and complement one another and are all equally necessary, almost inseparable.

EDUCATION

The objective of this section is to answer the questions: What programs are conducted by the North American colleges of veterinary medicine and what are the trends in curricula which should be considered in assessing the feasibility of a new CVM? Design of the curriculum for the proposed CVM is the responsibility of the faculty; therefore, this feasibility study is limited to an identification of the trends in veterinary education which influence the location of the college; the number of faculty, students, and staff; and the cost of building and operating the new college. For example, a curriculum designed to utilize government and private off-campus laboratories for instruction of students mandates that the college be located within a reasonable distance of those facilities. The number of faculty and staff (related to the number of students) is the most important factor influencing the size of the capital and operating budget for the CVM. Some determinants of the number of faculty required (and cost) relate to the educational processes, or philosophies, which are chosen for the CVM and the range of the curriculum offered.

Trends in Curricula Leading to DVM Degree

A survey of the U.S. and Canadian veterinary colleges was conducted to collect data relevant to the above questions. In addition, bulletins and catalogs obtained from the existing colleges served as sources of data on curricula. Proceedings of symposia on curriculum conducted in 1972 and in 1975 by the Association of American Veterinary Medical Colleges served to delineate trends in veterinary education (1,2,3). A symposium held at the University of Illinois in May, 1970, entitled "Food Animal Medical Education for the 1970's" outlines educational needs which are especially relevant to the OWR (4).

The Council on Education of the American Veterinary Medical Association evaluates each CVM at five-year intervals for purposes of accreditation. The Council in its publication entitled "Essentials of an Acceptable Veterinary Medical College" summarizes the characteristics of the professional curriculum as follows (5):

> Professional Curriculum - The curriculum should permit adjustment to the needs of veterinary medicine as a growing and expanding science; it should be sufficiently flexible to permit adjustments as suggested by experience and advances in knowledge.
>
> The curriculum should provide a sound foundation in the fundamentals of veterinary medicine, thereby equipping the student for the many responsibilities of his profession. It should develop habits of mind that will inspire the student to continue to educate himself throughout life and fully appreciate his professional obligations.
>
> In its evaluation, the Council will study the curriculum as a whole and in terms of its related parts. The professional curriculum shall extend over a period of at least four academic years of not less than 32 weeks each, averaging at least 30 clock hours per week.
>
> The curriculum should provide adequate instruction in the following subjects as applied to the various species of animals:

> anatomy, including histology and embryology; physiology; pharmacology; microbiology, including bacteriology, mycology, virology and immunology; pathology; parasitology; biochemistry; internal medicine; preventive medicine and public health; obstetrics; surgery; radiology; biometrics; anesthesiology; ophthalmology; and professional and public relations.
>
> In the clinical years, there is no adequate substitute for the "case method" of instruction. Students shall be supervised individually for applied training in hospital wards, ambulatory clinics, diagnostic and necropsy laboratories, as well as in disease control and veterinary public health. Such assignments should occupy most of the senior year and should be correlated with formal conferences, rounds in the hospital, and library assignments. Students must keep records of such activities.

Rapid changes in instructional methodology and curricula have occurred during the past decade. Ten of the twenty colleges responding to a questionnaire (1) indicated that their faculties had approved major curriculum changes between 1966 and 1972. Twelve of the twenty colleges were planning a major change within a few years. The items of primary concern were the philosophy of teaching basic and clinical sciences and the distribution of time to various subject areas. Provision of learning experiences outside of the CVM and increased utilization of physical facilities also were considered.

Alteration of clinical instruction is centered around the integration of formal courses with clinical medicine. Utilization of the patient case-study and/or organ systems are approaches to accomplish the above integration. One college has a pilot program which is designed to achieve integration by organizing most teaching around clinical signs and findings.

The major trend in curricula is the development of the core-elective approach. The "core" consists of those courses which are considered indispensable for all veterinary students and encompass all which each student must learn to earn the DVM degree. Core courses emphasize concepts which are common to all animal biology and disease, irrespective of species, in accord with the "one medicine" concept. These courses also encompass the biological differences that exist among animal species of major importance to veterinarians, especially those that affect the animal's responses to disease processes and to therapeutic regimens. Elective courses are intended to reenforce and expand core teaching and learning. Electives also offer the students a) options for concentration in their areas of interest, and b) opportunities to sample many professional fields in an effort to rationally choose their professional careers. Electives constitute from 10 to 25 per cent of the DVM curriculum.

Trends in distributing time to subjects include elimination of duplication, redistribution of time to provide for electives, deletion of material, and introduction of new material.

Learning experiences outside of the colleges are increasing. Preceptorship programs permit the student to gain a portion of his clinical education under the direction of veterinarians engaged in various fields of the profession. For example, preceptees may elect training with veterinary group practices which specialize in swine, beef cattle, dairy cattle, horses, or companion animals. Less frequently students choose preceptorships in research or with veterinarians who specialize in poultry, zoo animals, laboratory animals or wildlife.

Another trend in professional curricula is to increase the utilization of the physical plant by using the facilities year-round and more hours each day. At the beginning of the third year students in the majority of the colleges are enrolled in a 12-month, year-round program until graduation. Demonstrations involving hospital patients usually begin in the first month of the first year of the curriculum. Early introduction of clinical instruction involving students in the first and second years, as well as the third and fourth years, of the curriculum has resulted in high density and over utilization of the teaching hospitals.

Approaches to instruction oriented toward traditional disciplines (such as anatomy, physiology) are disappearing. The trend is to develop blocks, segments, modules, or tracks in which the disciplines are integrated. This development is leading to teaching by teams of faculty specialists. In these curricula, for example, there are no courses identified as biochemistry, anatomy, physiology and microbiology. Faculty in these sciences participate with faculty in radiology, surgery, internal medicine and pathology in presentation of integrated courses. Such courses taught by teaching teams are designated by inclusive names such as comparative medical principles, the cardiovascular system, the reproductive system, the endocrine system, the nervous system and so on until all body organ systems of all animal species are considered.

There is no trend to alter the length of the curriculum which now averages 229.4 quarter credit hours (in 13 quarters) among 20 of the 21 North American colleges (3). There is, however, a trend to move courses (i.e., general microbiology, genetics, physiological chemistry) from the veterinary medical to the preveterinary curriculum. One purpose of these shifts is to permit time for addition to the DVM program of new developments in veterinary medicine.

Finally, there is a current trend for students to engage increasingly in independent study programs. A remarkably large number of multimedia minicourses are being developed for use in the autotutorial laboratories. Media employed in the independent study programs include videotapes, radiographs, microscope slides, programmed texts, 2 x 2 slides, and continuous loop motion pictures. Computer assisted or computer managed instruction is in the early stages. This area should develop rapidly. Complete programs of computer managed instruction currently utilized in medical schools may serve as models for adaptation to veterinary medicine.

Summarization of this section might ideally include a typical curriculum leading to the DVM degree. Because the educational programs among the veterinary colleges vary widely it will be more useful to list the subject matter which is included in nearly all of the colleges:

Cell biology
Anatomy
Biochemistry (health and disease)
Physiology
Pharmacology
Parasitology
Pathogenic microbiology
Pathology
Preventive medicine
Epidemiology and public health
Medical genetics
Nutrition
Computer science
Environmental medicine
Surgery and orthopedics
Radiology
Internal medicine
Bionomics and ethology
Laboratory animal medicine
Theriogenology
Ophthalmology
Anesthesiology
Neurology and behavior
Cardiology

- Endocrinology
- Gastroenterology
- Urology
- Dermatology
- Aquatic medicine
- Toxicology
- Clerkships in food animal medicine, equine medicine and urban medicine
- Ethics, personnel and business management

Operating Costs Influenced by Technology and Curriculum

There is little if any data available to evaluate the cost involved in implementing innovative veterinary programs. In regard to technology-based, instructional media, the Carnegie Commission on Higher Education published a study which indicated that the new technologies as they apply to university level instruction are advancing much more slowly and costing more than was expected. Those technologies also seem to be adding to rather than replacing, more traditional approaches (6).

A learning resources center (LRC) ideally includes the library, autotutorial laboratory, and audiovisual production. The autotutorial laboratory contains learning carrels, computer terminals, slide and motion picture projectors, x-ray viewers, television monitors, and conference areas. Other areas of the LRC are devoted to dispensing learning materials. The audiovisual unit provides facilities for medical photography, illustration, and production of videotapes.

It is widely recognized that the lecture-laboratory-discussion method of instruction is the least costly. A curriculum that provides the student with wide selection from a large number of elective courses, multiple sections of classes with low enrollment, and instruction by teaching teams has proven to be extremely expensive. In fact, veterinary colleges find that additional faculty are required. Formerly, one professor taught all students in the class simultaneously; now, four to eight professors may be involved in teaching a single course using the team-teaching method. In the core-elective approach, there are many organizational problems affecting cost. Where a course formerly was offered once a year for a class size of 60 to 100 students, it may now be repeated three or four times a year for small groups of 4 to 25 students.

Trends in Post-DVM Education

Post-DVM education is education in veterinary medicine beyond the first professional degree (DVM or VMD). Such education includes internships and residencies, master's and Ph.D. degrees, and continuing education. Exclusive of continuing education, there were 1,323 students (690 with DVM and 633 without the DVM degree) enrolled in these programs in 1974-75 in the North American veterinary colleges.

Internship. An internship is a supervised program of advanced instruction in the veterinary medical specialties usually of one or two years duration, providing the individual with the opportunity to apply the principles he has learned during the formal portion of his DVM program. In addition, the intern may be able to take advanced course work in the basic or clinical sciences to extend his previous knowledge in these disciplines.

Residencies. A residency, being somewhat longer than an internship program, enables individuals to acquire exceptional proficiency in a discipline or medical specialty. All veterinary colleges in the United States and Canada offer residencies and/or internships. Residency programs are designed to prepare veterinarians for examination and certification by a specialty board recognized by the American Veterinary Medical Association. Such specialties reflect both societal and professional needs (e.g., pathology, public health, laboratory animal medicine, radiology, toxicology, surgery, ophthalmology, internal medicine, microbiology, theriogenology, cardiology, anesthesiology). The number of applicants for residency programs far exceeds the number of spaces available. There are few formal residency programs in existing CVM's offering education in many of the emerging fields, such as environmental health, herd health, and aquatic and zoo animal medicine.

Advanced Degrees. In the twenty-two U.S. and Canadian colleges of veterinary medicine reporting for 1974-75, there was a total of 655 M.S. students and 466 Ph.D. students. Veterinarians with advanced education in all fields of specialization are needed to provide specialists for practice, research and teaching positions.

Continuing Education. The purpose of continuing education is to enhance the professional competence of veterinarians and thus improve the quality and delivery of veterinary medical services. Continuing education may be defined as programs of study designed to provide veterinarians with specialized training as a supplement or refresher to their previous education. Such education varies from independent study to formal courses of instruction. Attendance at continuing education programs offered by the North American veterinary colleges totaled 14,765 in 1973-74. In the same year a total of 498 courses were offered by the 22 colleges; the number offered per college ranged from 1 to 113. Seventeen of the twenty-two CVM's have a position designated as "Director of Continuing Education" or equivalent. In 1974-75 state support for continuing education programs in the colleges varied from zero to $61,000. All or nearly all of the programs are self-supported through fees charged to participants who register for continuing education courses.

RESEARCH

The interdependency of teaching, research, and public service is manifested in varying ways. Graduate education consists primarily of research training; therefore, the faculty must not only provide graduate level courses but also maintain a vigorous and varied research program. Students seeking the DVM degree also participate in investigations to learn research methods. Veterinary colleges are responsive to the demands of livestock owners to investigate the animal diseases in their respective states which cause large death losses or losses of production of livestock products.

Veterinary medical research in the United States may be classified as follows:

1. Research related to agriculture
    a. food animals including poultry and marine animals
    b. horses
2. Veterinary research that contributes to the advancement of biology and medical science
    a. animal diseases transmissible to man (zoonoses)
    b. animal disease models of human diseases
    c. research in comparative medicine
3. Research on wild, zoo, fur bearing, companion, and laboratory animals

Financial support for research on food animals is provided through the Agricultural Experiment Stations. Those funds tend to focus maximum effort of veterinary faculty on (a) those diseases which have the greatest economic impact on food production, or (b) diseases of livestock (e.g., leptospirosis and erysipelas) which are transmissible to man. Veterinary colleges received over $5,000,000 for research in 1974-75 from the Experiment Stations. Those funds were partially used for salaries for 137 FTE faculty in the veterinary colleges. Research that is related to human health is funded primarily by the National Institutes of Health. Stipends for Ph.D. candidates are provided by the Fellowship and Training Grant programs of the National Institutes of Health.

PUBLIC SERVICE

Veterinary colleges in the nation are responsive to the public demands for a wide variety of services. Veterinary extension services designed to instruct animal owners in a multitude of animal problems are in high demand. Eighteen of the nineteen U.S. veterinary colleges employ extension veterinarians on U.S. Department of Agriculture, Smith-Lever, and/or state funds.

The aggregation in veterinary colleges of faculty specialists, highly trained staff, and sophisticated diagnostic and therapeutic equipment, makes available essential referral and diagnostic services. As the mass of scientific knowledge increases, no individual can be highly competent in all areas. The individual practitioner works very effectively, but he must have the benefit of a comprehensive staff of specialists, laboratories, and equipment available in a CVM to provide the ultimate in service to the animal owners. Animal patients with new or unusual diseases (or blood and tissue from such patients) when referred to the veterinary teaching hospital not only help the practicing veterinarian serve his clients but also provide valuable resources for teaching and research.

RECOMMENDATIONS

This study recommends that flexible programs of education be developed for the proposed CVM utilizing educational technology which is economically feasible.

This study recommends that educational planning give high priority to an elective program which includes preceptorships or externships. Utilization of existing resources in the Region such as existing courses and facilities in the universities, existing group veterinary practices, and private as well as governmental stations or laboratories is also recommended.

The faculty should have the opportunity to choose elements from the independent learning, lecture-laboratory and the core-elective approaches and to weigh the cost-benefits and educational merit as important selection criteria.

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CHAPTER 3

INSTITUTIONAL DATA ON THE NUMBER OF STUDENTS AND FACULTY IN THE REGIONAL COLLEGE

The "need study" determined the future public demand for veterinary medical services and the student demand for veterinary education (1). In accordance with the basic assumption that the CVM be "relevant to the needs of the Region," this chapter translates those needs into the number of students, faculty, and other people who must be accommodated by the college. A later chapter will present the gross square feet of space required for those people. The size of an institution is influenced by many factors, including 1) the demand for its graduates, and the number of students wishing to enroll, 2) the number and quality of the programs of instruction, 3) research programs, 4) professional and community services, and 5) the number of faculty and staff.

NUMBER OF STUDENTS

One key determinate of the size of a college is the number of students who are expected to enroll. Planning must also give consideration to the proportion of the total enrollees in each of the educational programs: DVM, M.S., Ph.D., residency, intern, and continuing education. No baccalaureate or certificate program for animal technicians is planned for the CVM because the "need study" concluded that the supply of animal technicians in the Region will exceed the projected demand after 1978.

Number of Students in DVM Program

Public demand for the professional services of the college's graduates and the number of students wishing to enroll in the DVM program (professional) are predominant factors in determining the size of the proposed college. Rapidly increasing demand for veterinary medical services in the Region was estimated to result in a shortage of 254 veterinarians in 1980, 573 in 1985, and 1,028 in 1990. A CVM is needed in the Region not only to avoid a serious deficit in the number of veterinarians but also to avoid continuing denial of educational opportunity in veterinary medicine for young people in the Region. A large number of young people want to become veterinarians. Preveterinary students in the Region's universities numbered 646 in 1974, and are estimated to reach 869 in 1980 and nearly 1,000 in 1990. In the absence of an Old West CVM, few students will achieve their goal because veterinary colleges outside of the Region already have excessively large enrollments. Over 88 percent of the applications from the Region were turned away in 1974 and over 95 percent are expected to be refused in 1975.

To date, the veterinary colleges in the United States, some with excessively large enrollments, have been unable to meet either the demands for their graduates or the demand of the large number of students who apply for admission. The U.S. veterinary colleges enrolled a total of 1,675 students in their entering classes in 1974. The mean number of entering students is 88 per college, and the median number is 86 (1). At the end of 1974, the total enrollment of professional students in all classes of eighteen of the nation's veterinary colleges in full operation was 5,922; the mean number was 329 and the median number was 334 (Table 3.1). In view of the above data and the rapidly growing demand for a regional CVM projected to 1990, it appears reasonable to plan for the regional CVM to accommodate a maximum total of 384 students in the DVM program (four classes of 96 each). It is reasonable to enroll 48 in the first class with expansion to 64, 72, and 80 in the first year in subsequent years. In as much as quality professional education and full accreditation is desired, it is recommended that the maximum first year class size not exceed 96 students.

Number of Graduate Students

Veterinarians planning a career in research and/or teaching usually complete a Master of Science or a Doctor of Philosophy degree in one of the basic or clinical veterinary medical departments (Table 3.1). An unprecedented number of employment opportunities as faculty in medical and veterinary medical schools and in industrial and government research laboratories motivates veterinarians to compete for admission into graduate programs. Expansion of existing veterinary colleges and the potential for opening new colleges in the nation within this decade creates a high demand for veterinarians with graduate degrees. In addition to opportunities for graduate education offered by the Region's Departments of Veterinary Science, it is reasonable for the regional CVM to plan for a total enrollment of 35 students in the M.S. programs and 30 in Ph.D. programs.

Number of Students in Residency and Intern Education

Residency education is an organized program of instruction of three to four years duration designed to enable veterinarians to acquire exceptional proficiency and certification in veterinary medical specialties. Intern education is similar but usually is one to two years in duration. Currently, there are 10 specialty organizations (for example, American

Table 3.1 Average Number of Students Enrolled in Educational Programs of the Colleges of Veterinary Medicine in the United States in the 1974-75 Academic Year

Educational Program	Number of Students (Mean Value)
DVM	329
M.S.	40
Ph.D.	32
Residency	6
Intern	7

Source: Survey of the U.S. Colleges of Veterinary Medicine

College of Veterinary Radiologists) recognized by the American Veterinary Medical Association (AVMA). Several additional fields of specialization are under development. Approved colleges or boards are responsible for examining and certifying veterinarians in the following veterinary specialties:

- Pathology
- Public Health
- Theriogenology
- Toxicology
- Radiology
- Microbiology
- Ophthalmology
- Surgery
- Laboratory Animal Medicine
- Internal Medicine

The demand for specialists exceeds the supply; the demand for residency and intern education exceeds the number of opportunities for training. For example, a growth rate of 10 percent from 1976 to 1980 was predicted for veterinarians certified in the specialty of laboratory animal medicine (2). Consideration of the survey of opportunities for residency and intern education in the nation's veterinary colleges as well as the demand for certified specialists leads to the conclusion that the regional CVM should plan to enroll 35 students in these programs.

Number of Students in Continuing Education

In November, 1974, veterinarians in each of the five states responded to a questionnaire designed to determine the current and future demand for continuing education (1). The survey revealed that 98.8 percent of the veterinarians participated in continuing education (CE) in 1974. Sixty-four percent of the veterinarians desire a larger number of offerings and 41 percent desire more relevant offerings in continuing education. Deficiencies in the existing programs means that veterinarians must travel long distances, involving considerable time and expense, to veterinary colleges outside of the Region for CE which fulfills their needs.

Many states in the country have or are moving toward mandatory CE requirements either for annual relicensure or for membership in an academy. Nebraska and North Dakota require CE for annual relicensure. South Dakota is considering mandatory CE, Montana has gone on record as favoring such a requirement, and Wyoming has organized a veterinary academy which requires CE for membership. The academy also conducts a practice or hospital review program. The survey data also indicated that veterinarians in the Region desire CE programs which can be taught best in the veterinary teaching hospital of the CVM.

It was estimated (1) that there will be 1,620 veterinarians in the Region by 1990. If the number of veterinarians who enroll in CE remains at 98.8 percent, it is estimated that the CVM and cooperating veterinary science departments in the Region can anticipate (98.8% x 1,620) 1,600 enrollees in CE annually. Conversion of 1,600 part-time to full-time equivalent (FTE) students follows. It is estimated that CE students will be enrolled on the average of 12 days out of 150 teaching days per academic year; therefore, 12/150 of 1,600 = 128 FTE continuing education students.

NUMBER OF FACULTY AND ADMINISTRATIVE PERSONNEL

The proposed college should be of sufficient size not only to provide high quality programs of education for its students, but also to excel in research and public services. Multiple activities of education, research, and service are essential and interrelated ingredients comprising the educational environment. Calculation of the number of faculty should consider the number required to (a) teach all the essential disciplines, (b) teach all levels of students, (c) provide patient care as a model for students, (d) provide a highly competent referral service, (e) conduct a diagnostic laboratory as a source of teaching material, (f) achieve excellence in research, and (g) be responsive to demands for university-wide and community service.

According to the student data presented above, there will be 612 full-time equivalent students enrolled. All students, except possibly a few graduate students in basic disciplines, will require animal patients in the veterinary teaching hospital and specimens in the veterinary diagnostic laboratory. In accordance with good standards for clinical instruction, the veterinary teaching hospital, field services and satellite clinics should provide at least five food animal patients, two equine patients, five small animal patients, and a total of five laboratory animal, avian, marine, zoo, and wildlife patients per student assigned to the respective clinical services. A large number of patients will require a proportionate number of faculty. The optimal setting for teaching is one professor, four professional students, one intern or resident, and an animal patient.

The degree of excellence in operating the college programs produces an upward or downward adjustment in the number of faculty. Other escalators of faculty numbers are: operation of the college on a year-round instead of a nine-months program; adoption of a curriculum with a large number of elective courses; number of students assigned per lecture or seminar or laboratory section; the student-teacher ratio; and the number of supporting staff (technicians, clerks, etc.) available. Seventeen of the nation's nineteen veterinary colleges have a four-year curriculum.

Estimation of the number of faculty required for the CVM is based upon adoption of a four-year program with year-round attendances of all students except two summers in the DVM program. It is also assumed that the faculty will (a) adopt a core-elective curriculum with a systems approach and a moderate number of elective courses, (b) operate a patient care program not exceeding the size required for teaching, and (c) consider cost-effectiveness in determining the number of students assigned to each teaching section.

Experiences at the existing veterinary colleges serve as the most reliable method for estimating the number of faculty required. Fewer faculty will be required during the planning period and early years of operation; therefore, for the purpose of estimating faculty numbers, it is assumed that the CVM has reached maximum enrollment.

Representatives from the 22 North American colleges of veterinary medicine studied the need for faculty at the Sixth Symposium on Veterinary Education held June 11-13, 1975. The symposium proceedings, published in July, 1975, presented up to date data on the ratio of faculty to students. Included in the total faculty work load are (a) instruction of all levels of students, (b) research, (c) professional services (patient care, diagnostic laboratory, extension services, and services to university and governmnent agencies), and (d) administrative duties of directors, department chairmen and deans.

In 1975, the ratio of total faculty to students was found to be 1 to 4.5 for DVM students and 1 to 5 for post-DVM students. Application of these ratios to the proposed number of students in the CVM indicates that 105 faculty will be required; 85 FTE faculty for the DVM program (384 ÷ 4.5 = 85) and 20 FTE faculty for the post-DVM program (100 ÷ 5.0 = 20). The National Academy of Sciences reported (4) the ratio of instructional faculty (excluding all non-teaching activities) to DVM students ranges from 1 to 7 to 1 to 13, with a median ratio of 1:9. In view of the necessity for coordinating the college activities, an associate dean for regional programs is added to bring the total number of faculty to 106 (96 faculty plus 10 directors, department chairmen, and deans) as is shown in Table 3.2.

Accomplishment of diverse functions in the college also requires appropriate non-academic or supportive staff: animal technicians, custodians, laboratory technicians, animal hospital staff, computer programmers, bookkeepers, typists, photographers, medical illustrators, etc). A ratio of 2.25 FTE supporting staff and student employees to 1.0 FTE faculty is used in this study to estimate the number of non-academic staff. State appropriated funds support 1.33 FTE and other funds support 0.92 FTE non-academic staff (total 2.25 FTE) to 1.0 FTE faculty member (ratio in American veterinary colleges in 1975).

SUMMARY OF PERSONNEL

Table 3.2 summarizes the number of faculty and administrative personnel and each level of student to be accommodated by the regional college. It should be noted that all students are post-baccalaureate and for planning purposes are considered as graduate-professional and graduate students.

TABLE 3.2 Summary of the Number of Students, Faculty, and Administrative Personnel to be Accommodated by the Regional College

Classification of Personnel	Number
STUDENTS (Candidates for Degrees)	
Doctor of Veterinary Medicine	384
Master of Science	35
Doctor of Philosophy	30
STUDENTS (Candidates for Certificates)	
Residency and Internship	35
Continuing Education	128
TOTAL NUMBER OF STUDENTS	612
FACULTY	96
ADMINISTRATIVE PERSONNEL (Directors, Dept. Chairmen, Dean)	10
GRAND TOTAL	718

Number of Students in the Regional CVM by State of Residence

Table 3.2 summarizes the total number of DVM and post-DVM students which, according to the data presented above, may logically be enrolled in the proposed college. An important decision must also be made concerning the number of student spaces to be allocated to each state.

Since the CVM is proposed as a unique regional institution, a plan must be devised which provides equitable utilization of the college by each state. A plan, presented in Table 3.3, allocates student spaces to each state in the same proportion that the state population is to the total population of the Old West Region. Calculations are based upon (a) population for 1980 and (b) assumption that the CVM will have reached its maximum enrollment. The 1980 population projections for each state were developed by Centaur Management Consultants in Washington, D.C. The data were developed in connection with the Old West Regional Commission's Economic Development Plan to be released early in 1976.

This state-population plan is an equitable arrangement which has two distinct advantages. First, it is easily administered because the number of students from each state is established by the official population figures of the U.S. Census Bureau. Secondly, the relatively stable distribution of student places facilitates planning for future financial obligations of the states as well as the numbers of students who will be enrolled.

TABLE 3.3 Population Basis for Full Time Equivalent (FTE) Student Space Allocation by State at Maximum Enrollment

			Number FTE Students				
			Professional				
State	Population in 1980(1)	Per cent(2) of Total Population	No. per Class	Four-Class Total(3)	Graduate Intern Residency	Cont. Edu.	Total by State
MT	733,100	18	17	68	18	23	109
NE	1,588,000	38	37	148	38	49	235
ND	637,600	15	14	56	15	19	90
SD	741,100	18	17	68	18	23	109
WY	451,100	11	11	44	11	14	69
	4,150,900	100	96	384	100	128	612

(1) Population projections developed by Centaur Management Consultants, Washington, D.C.,in connection with the Old West Regional Commission's Economic Development Plan to be released early in 1976.

(2) Rounded to nearest whole number from following calculated percentages, MT 17.66, NE 38.26, ND 15.36, SD 17.85, WY 10.87.

(3) Number in one class multiplied by four (number of classes in CVM).

RECOMMENDATIONS

It is recommended that the regional CVM be planned to accommodate a total of 612 FTE students including a maximum of 384 professional students, 65 graduate students, 35 interns and residents, and 128 continuing education students.

It is further recommended that each participating state be allocated student spaces in the same proportion that the population of each state is to the total population of the Old West Region.

This study recommends that a balanced program of instruction, research, and public service will require 96 faculty and 10 administrative personnel plus clerical, technical, custodial, and other support staff.

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CHAPTER 4

EVALUATION OF ALTERNATE LOCATIONS FOR A REGIONAL COLLEGE OF VETERINARY MEDICINE

The OWRC Veterinary College Advisory Board at its meeting on April 25, 1975, agreed with the widely held concepts and published reports which conclude that a new college of veterinary medicine should be located on the campus of an accredited university in close proximity to a college of agriculture and/or a college of medicine, and a graduate school (1,2,3).

UNIVERSITY ESSENTIAL TO CVM

Table 4.1 indicates that all the existing veterinary colleges in the United States are located on a university campus where there is a college of agriculture and/or a college of medicine, and a graduate school. Evaluation of the relationships among colleges of veterinary medicine, agriculture, medicine, and graduate studies revealed many distinct advantages to close association of these colleges on a university campus.

According to the Council of Education of the American Veterinary Medical Association (AVMA) it is important for a college of veterinary medicine to be located at an accredited institution of higher learning.

The following is a quotation from the "Essentials of an Acceptable Veterinary Medical School" published by the AVMA Council on Education:

> Organization - a School or college of veterinary medicine should find its most advantageous environment if it is part of an accredited institution of higher learning. In the best interests of both the institution and the veterinary medical school, the latter requires the same recognition and

Table 4.1 Location of Colleges of Veterinary Medicine in the United States

Location of Veterinary College		University Campus has Colleges Related to CVM		
Name University	State	College of Medicine	College of Agriculture	Graduate College
Auburn University	Ala.		X	X
Tuskegee Institute	Ala.		X	X
University of Cal.	Calif.	X	X	X
Colorado State Univ.	Colo.		X	X
University of Georgia	Ga.		X	X
University of Illinois	Ill.		X	X
Purdue University	Ind.		X	X
Iowa State University	Iowa		X	X
Kansas State University	Kan.		X	X
Louisiana State Univ.	La.		X	X
Michigan State Univ.	Mich.	X	X	X
University of Minnesota	Minne.	X	X	X
University of Missouri	Mo.	X	X	X
Cornell University	N.Y.		X	X
Ohio State University	Ohio	X	X	X
Oklahoma State Univ.	Okla.		X	X
Univ. of Pennsylvania	Pa.	X		X
Texas A & M University	Texas		X	X
Washington State Univ.	Wash.		X	X

> autonomy as other professional schools. A veterinary medical school may be fully accredited by the Council only when it is operated as a major administrative division of the parent institution and under the direction of a dean who is a veterinarian (1).

Each of the colleges, veterinary medicine, agriculture, medicine and the graduate college, as well as other colleges on the campus, utilize centralized university resources and services. Examples of such resources and services which are provided by the university and shared by all colleges are as follows:

student housing

food service

student health

recreation

traffic control and parking

research library (medline, MARC, AGRO, etc.)

research computer

specialized equipment (research spectrometers, high-voltage electron microscope)

registration

purchasing

shipping and receiving

maintenance of buildings, equipment, and grounds

accounting

liaison with state and federal governments

communication (printing, radio, TV, campus mail)

personnel services

university airport

radiation safety

The above examples of essential facilities and services which are provided to a CVM by the university indicate the necessity for location of the regional CVM on an existing university campus. The cost of duplicating the university services for a CVM located off a university campus is prohibitive.

The above findings lead to the conclusion that it is educationally and financially infeasible to establish a CVM as a free-standing institution outside of a university campus.

Graduate College Essential to CVM

Like medical education, veterinary education is essentially post-baccalaureate and is classified as graduate-professional education. In addition to offering the Doctor of Veterinary Medicine degree, veterinary colleges offer graduate programs in its basic and clinical science departments under the auspices of an accredited graduate college.

Vital components (service courses) of graduate programs in veterinary colleges are graduate courses given in departments outside of veterinary departments. Graduate students in M.S. and Ph.D. programs in veterinary departments are required to take graduate level courses in departments throughout the university such as biochemistry, biomedical engineering, animal science, dairy science, and nutrition. If veterinary medicine were located at a university without the above graduate departments, it would be imperative to develop such departments in the CVM complete with graduate level faculty. It would be inordinately expensive and infeasible to duplicate such graduate departments which already exist in the Region's graduate colleges.

College of Agriculture and/or College of Medicine Essential to CVM

Extensive collaboration and sharing of facilities among colleges of agriculture, medicine, and veterinary medicine strengthen their respective programs and minimizes costs.

The National Academy of Sciences publication entitled "New Horizons for Veterinary Medicine" stated the following concerning location of new colleges of veterinary medicine:

> Veterinary medicine occupies a unique position as a bridge between medicine, agriculture, and biology. Colleges of veterinary medicine that enjoy close geographical and functional relations with schools of medicine and agriculture and with departmental or other groupings in the biological sciences are greatly strengthened.
>
> WE RECOMMEND, therefore, that any new colleges of veterinary medicine that are established be located on campuses with medical colleges and that they have a close functional relationship in organizational structure, location, and program. At the same time, these veterinary colleges should maintain strong links with agriculture and biology (2, p. 138).

Advantages of a College of Veterinary Medicine Being Associated with a College of Medicine

1. The disciplines and departments are nearly identical to those in veterinary medicine except for psychiatry which in veterinary medicine is designated animal behavior.

2. Methods of instruction in these and other health programs are similar. Basic science faculty in these professional colleges have parallel programs of teaching, professional instruction, graduate education, and research. Clinical instruction involving animal patients utilizes the same learning objectives and methods as instruction utilizing human patients. Many programs of computer assisted instruction can be used for both medical and veterinary medical students.

3. Close cooperation between these two professional colleges avoids duplication in the medical school of divisions of laboratory animal medicine, animal radiology, animal pathology, animal surgery, and animal anesthesiology. Faculty, technical personnel and facilities need not be duplicated.

4. Medical schools have divisions or departments of veterinary medicine or laboratory animal medicine, thus indicating the essential role of veterinarians in the teaching, research, and service programs of a college of medicine.

5. Two-thirds of the holdings of a veterinary medical library are contained in a medical library; therefore, a joint library would provide convenience as well as savings in cost. Medline is a retrospective and current literature search used by both medicine and veterinary medicine.

6. The availability of many thousands of animal patients annually in the veterinary hospital is an asset to medical research. Animal models of human diseases are discovered and characterized by the veterinary faculty and open opportunities for collaboration with physicians to extend knowledge of human diseases through the study of animal models.

7. Association with medicine often places applications for federal construction and research grants for veterinary medicine in a higher priority. Joint proposals are looked upon more favorably than independent proposals. For example, laboratory animal resources, and animal and human heart diseases suggest productive collaboration in joint applications for research and training grants. Three-fourths of the National Institutes of Health (NIH) grants for medical research support investigations involving animals.

Disadvantages of Affiliation with Medicine Rather than Agriculture

1. Public support of veterinary medicine may be more effectively achieved by a college of agriculture than a college of medicine. Medicine is not organized and motivated as well as agriculture to gain public support for veterinary medicine.

2. Colleges of medicine are located in urban areas where large numbers of human patients are available for instruction of students. Veterinary education requires a diverse number of animal patients ranging from horses and food animals found in the rural areas as well as the companion and zoo animals from the urban areas. Location of a veterinary college in a large urban medical center tends to reduce the availability of food animal and equine patients unless the CVM develops a rural as well as an urban animal teaching hospital.

3. The absence of an agricultural experiment station and liaison with the United States Department of Agriculture reduces opportunities for veterinary medical research funds pertaining to food animals and horses.

4. Certain aspects of a large animal hospital may be considered a nuisance unless its location is to the periphery of a medical school complex.

Advantages of Association with a College of Agriculture

1. Colleges of agriculture have departments of veterinary science. Faculty consisting primarily of veterinarians are engaged in preveterinary education, graduate education, veterinary medical research, and veterinary extension programs which may be expanded into a college of veterinary medicine.

2. The charter of a state may restrict the development of all programs of veterinary education to one location. For example, a new CVM in the state must be located where there is an existing department of veterinary science.

3. The veterinary faculty are available to provide veterinary medical services to maintain the health of the agriculture college's herds and flocks. Although colleges of agriculture employ veterinarians to maintain the health of herds and flocks, the presence of a college of veterinary medicine greatly enhances this service. The value of the veterinarians to animal agriculture is his knowledge of medicine.

4. Colleges of agriculture have ongoing cooperative extension programs which can be readily expanded to include veterinary extension.

5. Federal and state funds for veterinary medical research involving food animals and horses are customarily administered through the agricultural experiment station.

6. There are opportunities for collaboration with the agriculture faculty in research on problems in many areas such as animal nutrition, genetics, reproduction, lactation, growth, and meat hygiene.

Disadvantages of Affiliation with Agriculture

1. The college of agriculture attempts to maintain disease-free herds and flocks. Therefore, it is essential that veterinary medicine maintain its diseased animals and birds safely isolated and remote from the healthy animals.

2. Agriculture would be of limited assistance in seeking grants from the National Institutes of Health for health research.

3. The veterinary college would lack the assistance of medical

school administration in maintaining liaison with the National Institutes of Health, Department of Health, Education and Welfare, U.S. Public Health Service, and other agencies concerned with the support of health education and research.

4. There would be no significant savings in facilities, equipment, and library collections except for those existing in the veterinary science departments.

5. The agriculture library is of limited value for veterinary medicine in comparison to a medical library.

6. Except for veterinary science there are no parallel departments in agriculture such as those of anatomy, physiology, pharmacology, radiology, medicine, surgery, and public health required in a veterinary medical college.

METHOD FOR EVALUATION OF ALTERNATE LOCATIONS FOR PROPOSED COLLEGE

Selection of an optimal location for development of the proposed veterinary college requires the design and use of objective and quantitative methods. In 1973, Cole and Knezek published a method for determining the most favorable location for a new CVM (3). Twenty distinguished leaders representing nearly all facets of the veterinary medical profession plus nine nonveterinary leaders identified and validated 60 elements of a desirable location considered to be significant for the effective, efficient, and economical establishment and operation of a CVM. It was recognized that those elements (criteria) varied in importance and might vary in different regions of the United States. Therefore, each of the 60 criteria were evaluated by the OWRC Veterinary College Advisory Board and weighted on a 1.0 to 5.0 scale, 1.0 being the least significant and 5.0 being the most important in the Old West Region. For each criterion, the weights given by each member of the Advisory Board were totaled and divided by the number of people who evaluated that criterion. The mean weight derived in this manner for each criterion is shown in the list below. The criteria are arranged in rank order from most to least significance for three categories: general campus criteria, criteria for assessing colleges of agriculture, and criteria for assessing colleges of medicine.

General Campus Criteria

(In rank order)

There is legislative climate for support.	4.7
The proposed site is easily accessible by auto.	4.6
The institution has demonstrated its interest in having the proposed college.	4.5
There is an adequate supply of land adjacent to the campus available for purchase that could be used by a veterinary college.	4.3
The institution has adequate support services to accomodate veterinary medicine.	4.3
There is an adequate supply of potential food producing and zoo animal patients.	4.2
The existing library facilities can accommodate the veterinary medical students and faculty.	4.2
There is an adequate supply of university owned land that could be assigned to a college of veterinary medicine research farm.	4.1
There is an existing agriculture college on the campus.	4.1
There is an adequate supply of potential companion animal patients.	3.9
There is an adequate supply of university owned land on campus that could be used for a college of veterinary medicine.	3.8
The institution is easily accessible to the entire Region.	3.8
There are other satellite facilitites which could be used by the veterinary medical students.	3.8
The Institution is easily accessible to the entire Region by air.	3.6
The veterinary research farm will not be a nuisance to the surrounding area.	3.6
There is support by veterinarians.	3.4
The general terrain of the area is suitable for the purpose of the new college.	3.4

There is a division of Allied Health Sciences on the campus.	3.3
The institution is far enough away from the existing veterinary colleges so that there would be no unnecessary overlap in functions.	2.9
There is public transportation to and from the proposed site.	2.9
The housing is adequate for supplying the needs of the veterinary student.	2.7
There is an existing or proposed and funded medical college on the campus.	2.2
There is a division of Public Health or equivalent on the campus.	2.2
There is a college of pharmacy on the campus.	2.2
There is a college of dental medicine on the campus.	1.5

Criteria for Assessing the School of Medicine

The continuing education facilities are available for use by the veterinary college.	4.3
The research facilities are available for use by the veterinary college.	4.2
There is a medical library with space available for the addition of veterinary medicine.	4.2
The teaching facilities are available for use by the veterinary college.	4.0
There is an effective biomedical research program.	4.0
The medical college has a division of laboratory animal medicine.	3.6
The clinical facilities are available for use by the veterinary college.	2.4
There are human patients potentially available for veterinary medical student instruction.	1.2

Criteria for Assessing the Division of Laboratory Animal Medicine Within the School of Medicine

The division conducts research projects.	3.7
The division offers residency training for veterinarians in laboratory animal medicine .	3.5
The division offers graduate courses leading to a degree.	3.4
The division offers a wide range of services.	3.3
There is an animal farm affiliated with the division.	3.2
The services are available to many different organizations.	3.1
The division offers an animal technician training program.	1.5

Criteria for Assessing the College of Agriculture

The college has an agricultural experiment station.	4.6
There is an animal research farm affiliated with the university.	4.4
The college has a veterinary science department or equivalent.	4.4
There is an effective biomedical research program.	4.0
There is an agricultural library with space available for the addition of veterinary medicine.	4.0
The college has a continuing education program for veterinarians.	4.0
The college has a veterinary extension program.	3.8
There is a library or portions of a library assigned to veterinary science.	3.7
The college has a division of laboratory animal resources to serve the entire university.	3.1
The college offers an animal technician training program.	1.5

Criteria for Assessing the Department of Veterinary Science within the College of Agriculture

The department operates a state diagnostic laboratory.	5.0
There is an effective veterinary research program.	4.6
The department offers a program in preveterinary medicine.	4.2
There is an effective extension-diagnostic service program.	4.2
There is an existing M.S. and Ph.D. program.	3.3
There is an existing M.S. program.	2.9
There is an existing Ph.D. program.	2.7
The department offers a residency program.	2.2
The department offers a residency and internship program.	2.2
The department offers an internship program.	2.0

POTENTIAL LOCATIONS FOR A REGIONAL CVM

As indicated in the previous section, development of a veterinary college can be achieved most effectively, efficiently, and economically by a university which currently has a) high quality graduate programs in biology and medicine, and b) strong leadership committed to expeditiously opening and operating a regional CVM. Letters to the presidents or chancellors of each public university in the Region which has a college of agriculture or a college of medicine requested a decision on whether or not the university wished to be evaluated as a potential location for the proposed CVM. Conversations with the leaders of each university further delineated the degree of interest and the perceived role of each institution in the development and operation of the CVM.

There are three public universities in the Region which have a funded college or school of medicine: The University of North Dakota, the University of South Dakota, and the University of Nebraska. The three medical schools expressed the desire to collaborate and cooperate in every feasible manner with the regional CVM, but urged that the CVM be located on campuses in their respective states (North Dakota, South Dakota and Nebraska) where there is an existing Department of Veterinary Science.

Response to the inquiry, summarized in Table 4.2, indicates that five universities are interested in developing the regional CVM. The map shown in Figure 4.1 shows the regional distribution of these five universities considered as condidates for the proposed college.

TABLE 4.2 Interest of Universities in Developing a Regional College of Veterinary Medicine.

Campus	College of Agriculture or Medicine	Expressed Interest
Montana State University - Bozeman	Agr.	Yes
University of Nebraska - Lincoln	Agr.	Yes
University of Nebraska - Omaha	Med.	No
North Dakota State University - Fargo	Agr.	Yes
University of North Dakota - Grandforks	Med.	No
University of South Dakota - Vermillion	Med.	No
South Dakota State University - Brookings	Agr.	Yes
University of Wyoming - Laramie	Agr.	Yes

Source: Letters from President or Chancellor of each University and/or conference with university and college officials.

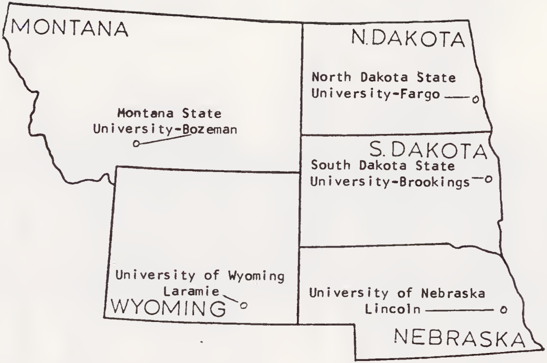

MONTANA
N.DAKOTA
North Dakota State University-Fargo
Montana State University-Bozeman
S.DAKOTA
South Dakota State University-Brookings
University of Wyoming Laramie
WYOMING
University of Nebraska Lincoln
NEBRASKA

FIGURE 4.1. Geographic Distribution of Universities in the Old West Region Which Are Potential Locations for a Regional College of Veterinary Medicine

Collection of Data from Candidate Universities

At this point in the evaluation methodology the criteria had been validated and their relative importance established by assigning weights. The next step in the locational analysis was to develop a questionnaire to obtain data from each candidate university relative to the criteria for locating the proposed CVM. The questionnaire is shown in Appendix A. Data were also obtained from university and college bulletins, campus maps of master plans and land uses, the New American Guide to Colleges by G.R. Hawes and P.N. Novalis (4), animal population by counties from the state and U.S. governments, demographic and weather data from the U.S. government, and maps of each of the five states showing counties. Finally, Dr. C.R. Cole and Dr. B.W. Kingrey (former deans of Colleges of Veterinary Medicine in Ohio and Missouri, respectively) visited the candidate universities for the purpose of a) validating data collected by questionnaire, b) ascertaining what specific actions have been taken by each university and state legislature that demonstrate interest in developing a CVM, and c) physically inspecting, appraising, and determining the appropriateness of the facilities, equipment, land, and human resources which may be assigned to or shared with a CVM. Information not provided or not amenable to questionnaire form was collected during the site visits. Individuals visited at each campus are listed in Appendix B.

Structured data collection forms were designed to facilitate interviews and systematic recording of observations as the sites proposed by each campus for the regional CVM were evaluated. Examples of topics covered by the form include: interest in developing a CVM demonstrated by the state and university; existing facilities and staff which can be assigned to or shared with the CVM; current costs of construction per gross square foot; existing educational programs which may serve veterinary students; size, topography, and location of land assignable to veterinary medicine; and current and proposed construction on the campus.

Data obtained from all sources including questionnaires and site visits were compiled for each of the candidate campuses. The format of the compilation matched the criteria rating scales in form and content because both were constructed using the criterion as the basic unit (Appendix D). An analysis was made of the relative merit of all potential locations. The method employed for this locational analysis, previously published by Cole and Knezek, was validated by a Master Panel comprised of five prominent professionals in the field of veterinary medicine (3). Members of the Panel had diverse educational backgrounds and professional experience encompassing the practice of veterinary medicine, accreditation of veterinary colleges, continuing education, curriculum and student affairs, research, graduate education, veterinary medical specialties, program and facilities planning, and financial analysis.

In addition to campus facilities, the questionnaire and site visits identified intra-state, private, industrial, federal, and state facilities and resources which offer potential opportunities for enhancing veterinary education and research. Resources outside of the proposed CVM, compiled in Appendix E, need not be duplicated and are designated as satellite facilities.

Method for Rating Location Data

A form was designed to compile the data from potential locations in a manner which can be juxtaposed with the criteria. In addition, scales were developed to determine the degree to which each candidate campus met each criterion. A scale of 0.0 to 20.0 as shown on the set of rating scales in Appendix C, were applied so that each potential location for the CVM could be given a numerical score. A panel of judges evaluated the extent to which the scales did, in fact, measure a given criterion (3). The following example shows how one of the criteria was translated into quantifiable terms. The number of acres of campus land used by each of the colleges of veterinary medicine in the United States served as the basis for the rating scale (unpublished survey by Cole and Johnson, 1972).

Criterion	Rating Scale			Data Source
	0 Low	10 Med.	20 High	
There is adequate number of acres of university owned land on campus reserved for CVM	20 or less acres	21-34 acres	35 or more acres	Questionnaire Campus map Site visit

The above numerical units, 0, 10, and 20, comprise a rating scale used in determining the degree to which each candidate campus meets each of many criteria. Thus, a campus which will allocate only 12 acres of land to the CVM received a score of "0", while a campus which reserved 40 acres received a score of "20" on this criterion.

At this point a rating sheet was completed by applying the criteria rating scales (Appendix C) to the data compilation for each campus (Appendix D). To clarify this method an example is given below. Where 30 acres is reserved on a campus for a CVM the rating will be "10". The OWRC Veterinary College Advisory Council weighted "an adequate supply of campus land" at 3.8; therefore, the rating of "10" multiplied by the weight 3.8 yields the weighted rating of 38.

Criterion	Rating Scale			Rating Received (0, 10, or 20)	Weight	Weighted Rating (Rating X Weight)
There is adequate number of acres of university land on campus reserved for CVM.	0 Low 20 or less acres	10 Med. 21-34 acres	20 High 35 or more acres	10	3.8	38

RESULTS

Mean Scores and Final Rankings of Candidate Universities

The objective numerical scores obtained by multiplying the rating times the weight for each criterion were totaled for each university. The total scores and the ranking for each candidate university are shown in Table 4.3. The maximum score attainable is 4,282; in other words a score of 4,282 indicates that the university equaled or exceeded the highest level for each of the criteria. Of a possible 100 per cent score of 4,282, the University of Nebraska received 3,741, or 87.4 per cent; South Dakota State University received 2,561, or 59.8 per cent; Montana State University received 2,384 or 55.9 per cent; North Dakota State University received 2,139, or 50.0 per cent; and the University of Wyoming received 1,928, or 45.0 per cent. In addition to the total scores, Table 4.3 shows ratings on general campus criteria and college of agriculture criteria.

On the basis of the scores received the universities are ranked in order from the most favorable to the least favorable location for the regional CVM as follows: The University of Nebraska, South Dakota State University, Montana State University, North Dakota State University and the University of Wyoming.

TABLE 4.3. Results of Locational Analysis:
Mean Scores and Final Rankings

Campus	Rating General Campus Criteria	Rating College of Agriculture Criteria	Total Score	Final Rank
University of Nebraska - Lincoln	2407	1334	3741	1
South Dakota State University - Brookings	1703	858	2561	2
Montana State University - Bozeman	1394	1000	2394	3
North Dakota State University - Fargo	1459	680	2139	4
University of Wyoming - Laramie	1308	620	1928	5
Possible Range	0 - 2598	0 - 1684	0 - 4282	

Advantages and Disadvantages of Each Candidate University

Analysis of each criterion for rating the potential locations of the CVM not only provide a quantitative evaluation, but also identify specific advantages and disadvantages for each site. If the candidate university received a high or medium rating on a criterion, that factor was listed as an advantage. If the university did not meet the minimum level for a particular criterion, then that factor was listed as a disadvantage. The advantages and disadvantages for each candidate university follow:

Montana State University

Bozeman, Montana

Advantages:

1. The University has a high degree of interest in developing a regional CVM.
2. In a 10,000 square mile area around the University and within the state, there are modest numbers of beef cattle, sheep and goats, and horses.
3. The University will assign 40 acres of campus land to the CVM and will purchase 80 acres for the veterinary research farm which it is currently leasing. The elevation and terrain of both sites is good, and both are located so animals will not be a nuisance (See Figures 4.2 and 4.3).
4. The site is easily accessible by air. Gallatin Field is 8 miles, 10 minutes driving time, from the campus. Cars and trucks have access via five federal and two state highways.
5. The CVM site is within 10 minutes walking distance from housing and relevant campus buildings.
6. University dormitories and apartments have an adequate number of units for single and married veterinary students.
7. The University is an adequate distance, 497 miles, from the nearest existing CVM at Pullman, Washington, to avoid overlapping functions.
8. Fifty per cent of the veterinary medical library can be housed in the University general library.
9. Available support services include: computer, recreation, and student health.
10. The University has a college of agriculture, a program in medical technology, and shares a M.D. curriculum with the University of Washington.
11. Support for a regional CVM is rated good for the legislature, and enthusiastic for the veterinarians in Montana.
12. A large number of satellite facilities in the state can be used by the CVM. (See Appendix E.)

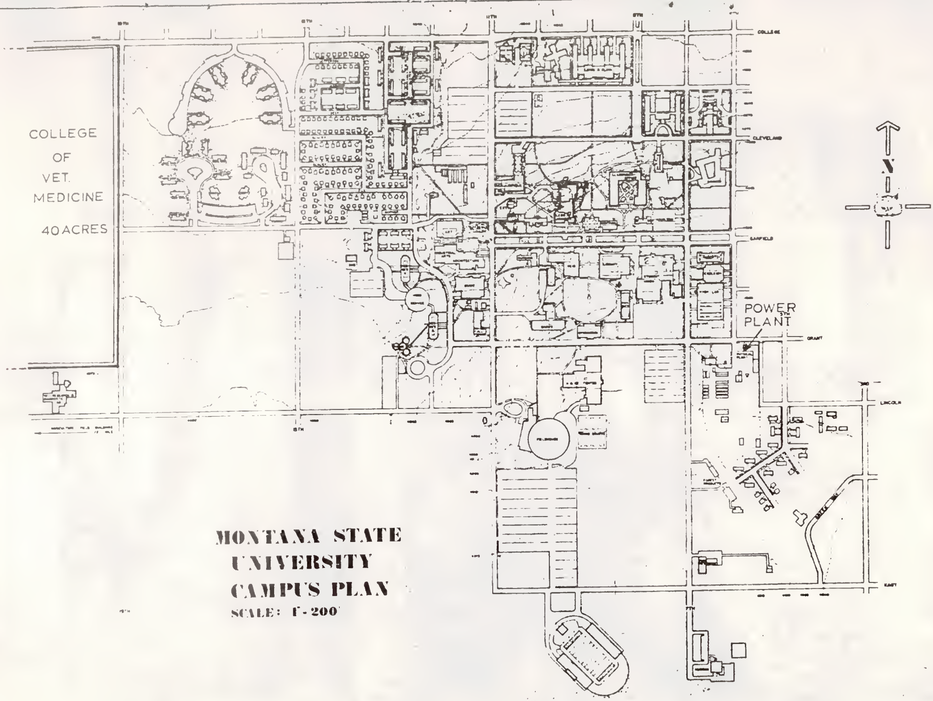
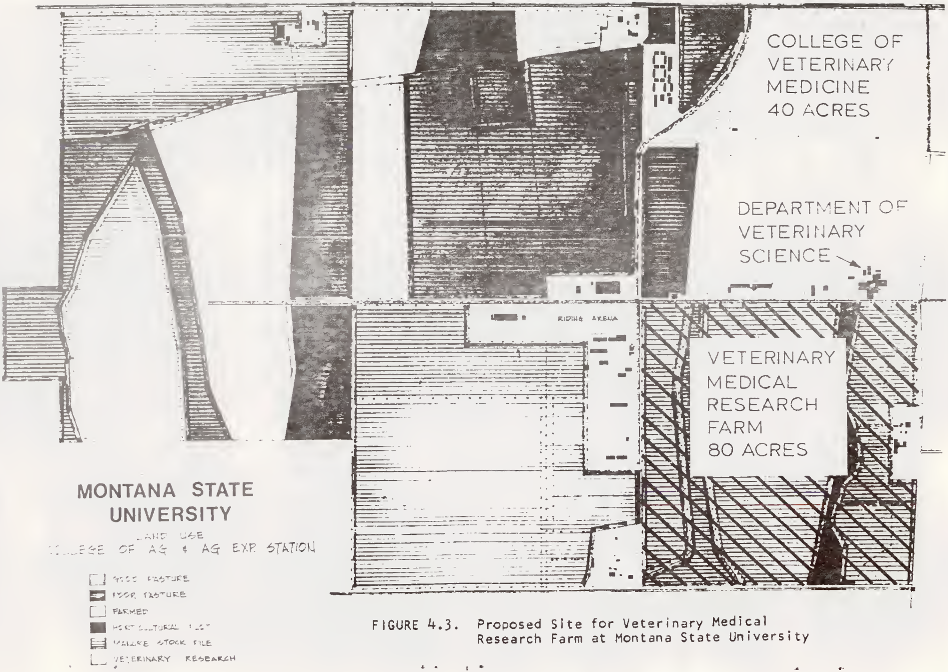

COLLEGE OF VET. MEDICINE 40 ACRES
POWER PLANT
COLLEGE
CLEVELAND
GARFIELD
GRANT
LINCOLN
N
MONTANA STATE UNIVERSITY CAMPUS PLAN
SCALE: 1"-200'

FIGURE 4.2. Proposed Site of College of Veterinary Medicine at Montana State University



COLLEGE OF VETERINARY MEDICINE 40 ACRES
DEPARTMENT OF VETERINARY SCIENCE
RIDING ARENA
VETERINARY MEDICAL RESEARCH FARM 80 ACRES
MONTANA STATE UNIVERSITY
LAND USE
COLLEGE OF AG & AG EXP. STATION
GOOD PASTURE
POOR PASTURE
FARMED
HORTICULTURAL PLOT
MANURE STOCK PILE
VETERINARY RESEARCH

FIGURE 4.3. Proposed Site for Veterinary Medical Research Farm at Montana State University

13. There are animal research farms. The fiscal 1974 expenditures for biomedical research in the College of Agriculture and Agricultural Experiment Station totaled $1,414,693 and involved 26 FTE faculty.

14. The Veterinary Science Department has 5.0 FTE, DVM faculty and 9.9 FTE, non-DVM faculty.

15. Educational programs offered by the Department of Veterinary Science include preveterinary medicine, M.S., and Ph.D.

16. A diagnostic laboratory expended $51,218 per professional staff member in fiscal 1974 and is available for teaching veterinary students.

17. In fiscal 1975, there is budgeted $311,776 for veterinary medical research involving 12.4 professional personnel in the Department of Veterinary Science.

Disadvantages:

1. The University is located 464 miles by auto from the geographic center of the OWR.

2. In a 10,000 square mile area around the University and within the state the number of dairy cattle, hogs, poultry, zoo animals, dogs, and cats is inadequate.

3. Only 50 per cent of the space required for a veterinary medical library is available.

4. The power plant has inadequate capacity and is located too great a distance from the site to serve the CVM buildings.

5. The University has no funded colleges of medicine (except for curriculum sharing), pharmacy, dentistry, and public health.

6. There are no programs offered in veterinary extension, veterinary continuing education, animal technology, and intership or residency programs. (Animal technicians are trained at Havre and Glendive).

7. The University has no centralized division of laboratory animal resources to serve the entire institution.

University of Nebraska

Lincoln, Nebraska

Advantages:

1. The University has a high degree of interest in developing a regional CVM.
2. In a 10,000 square mile area around the University and within the state there are large numbers of beef cattle, dairy cattle, hogs, poultry, zoo animals, dogs, cats, and horses. There is an adequate number of sheep and goats.
3. The University will assign 40 acres of campus land to the CVM and 300 or more acres of land to the veterinary research farm. The elevation and terrain of both sites are optimal and both are located so animals will not be a nuisance (See Figures 4.4 and 4.5).
4. The site is easily accessible by air. Lincoln airport is 7 miles, 15 minutes driving time, from the campus. Cars and trucks have access via four federal and one state highway.
5. The site for the CVM is within 10 minutes walking time from housing and relevant campus buildings.
6. University housing is more than adequate for single students and private housing is available for married veterinary students.
7. The University is 134 miles from the nearest existing CVM at Manhattan, Kan., an adequate distance to avoid overlapping functions.
8. The Thompson Library contains excellent medical and veterinary medical holdings and full computer based services. All the space required for 20 years by students and faculty of a CVM is available. The medical library at the UN Medical Center is also available to the CVM.
9. Support services are available including: computer, recreation, student health, and power plant. The boiler and central chiller capacity is more than adequate for CVM buildings.

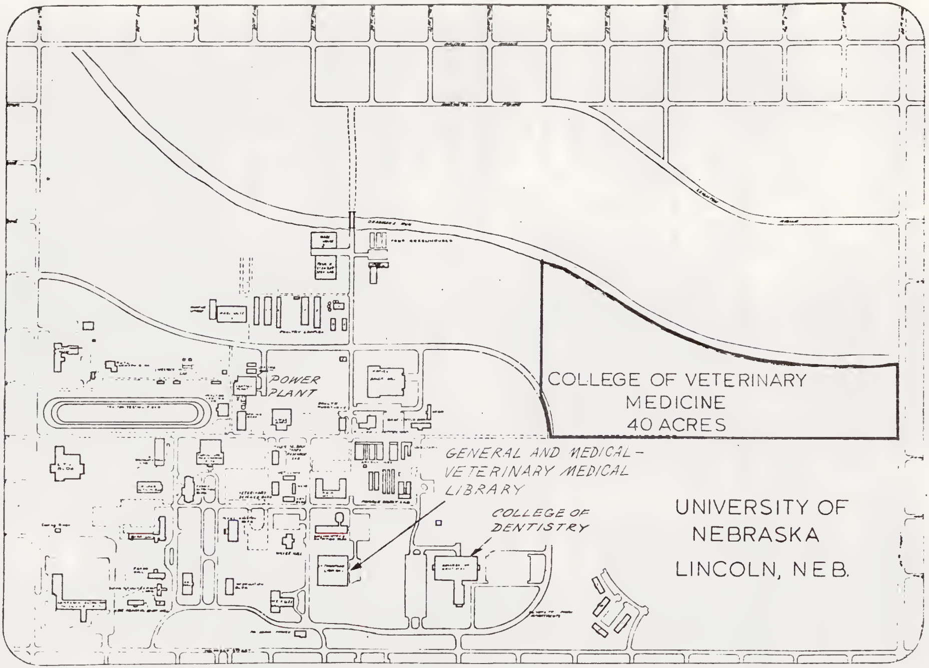

POWER PLANT
COLLEGE OF VETERINARY MEDICINE
40 ACRES
GENERAL AND MEDICAL-VETERINARY MEDICAL LIBRARY
COLLEGE OF DENTISTRY
UNIVERSITY OF NEBRASKA
LINCOLN, NEB.

FIGURE 4.4. Proposed Site of College of Veterinary Medicine at the University of Nebraska

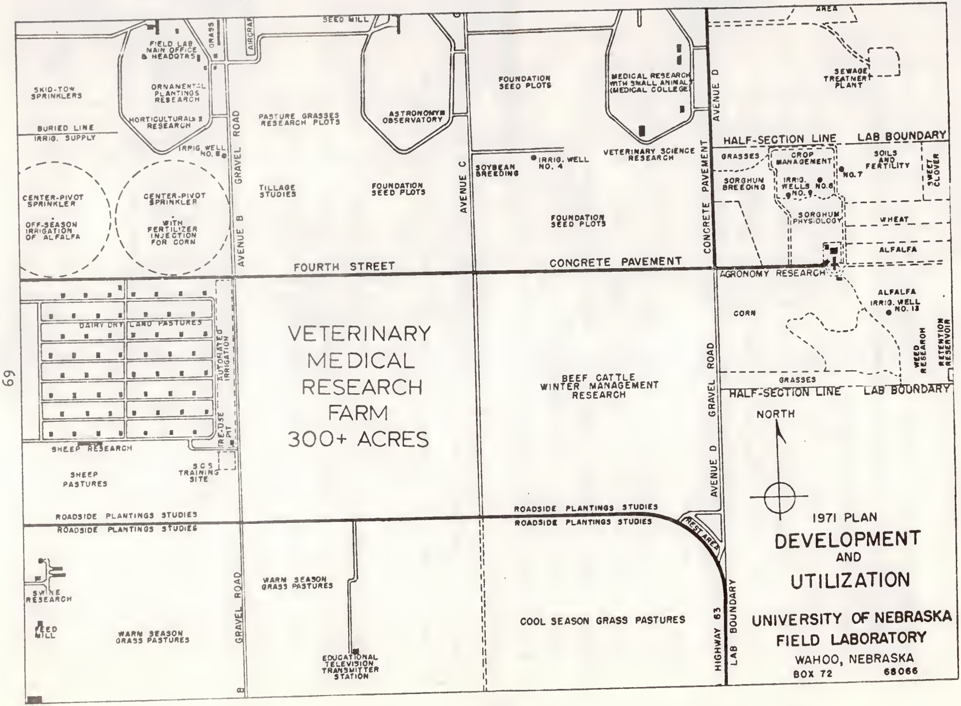


FIGURE 4.5. Proposed Site for Veterinary Medical Research Farm at the University of Nebraska

10. There are colleges of agriculture, dentistry, and pharmacy in the University.

11. Graduate and research programs are conducted jointly between the Department of Veterinary Science and the U.N. College of Medicine.

12. There are nine programs offered in the Division of Allied Health Sciences.

13. The Legislature authorized but did not fund a CVM at the UN-Lincoln. On May 22, 1975, the 84th Nebraska Legislature passed a resolution favoring location of the regional CVM at the UN-Lincoln and extended whatever cooperation may be required.

14. The Nebraska Veterinary Medical Association assisted in a study: "Alternatives for Veterinary Medicine in Nebraska", published in 1974.

15. A large number of satellite facilities are available to enhance veterinary education and research. (See Appendix E.)

16. The Veterinary Science Department has 12 FTE, DVM faculty and 4 FTE, non-DVM faculty.

17. Continuing education programs are offered for veterinarians and the veterinary extension program is well developed; $129,879 was expended for veterinary extension in fiscal 1974.

18. There are animal research farms. The fiscal 1974 expenditures for biomedical research totaled $12,794,659, and involved 27.7 FTE faculty.

19. Educational programs offered by the Department of Veterinary Science includes preveterinary medicine, M.S. and Ph.D.

20. A diagnostic laboratory expended $78,589 per professional staff member in fiscal 1974, and is available for teaching veterinary students.

21. In fiscal 1975, there is budgeted $642,931 for veterinary medical research involving 10.11 FTE professional personnel in the Department of Veterinary Science.

Disadvantages:

1. The University is located 513 miles by auto from the geographic center of the OWR.
2. There is no school or division of public health in the University.
3. The animal technology program is offered far from Lincoln at Curtis, Nebraska.
4. There is no centralized division of laboratory animal resources at UN-Lincoln.
5. There are no veterinary intern and residency programs.

North Dakota State University

Fargo, North Dakota

Advantages:

1. The institution has a high degree of interest in developing a regional CVM.
2. In a 10,000 square mile area around the University and within the state there are moderate numbers of dogs, beef cattle, hogs, sheep, and goats.
3. The University will assign to the CVM a minimum of 35 acres of campus land; also, they will assign 150 acres for a research farm located 2 miles from campus. The campus site as well as the research farm has optimal terrain and large animal research will not be a nuisance to the surrounding campus and residential areas. (See Figures 4.6 .)
4. The proposed site is easily accessible by auto via two interstate and four U.S. highways. The Fargo Municipal Airport is one mile, or five minutes driving time, from the proposed site.
5. The site is within 10 minutes walking time from other campus buildings.
6. The institution is far enough away from existing veterinary colleges (245 miles from St. Paul, Minn.) so that there would be no unnecessary overlap in functions.
7. The following support services are adequate to accommodate veterinary medicine: computer, recreation, student health.
8. There are colleges of agriculture and pharmacy and a medical technology program in the University.
9. The legislature and veterinarians in North Dakota both support the establishment of a CVM.
10. There are an adequate number of sattelite facilities in the state which could be used by a CVM. (See Appendix E.)

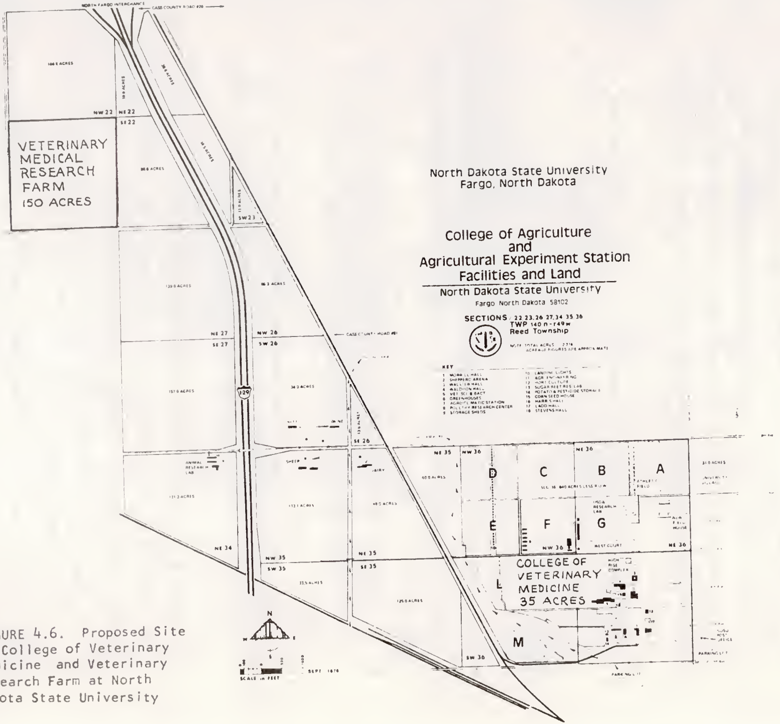


FIGURE 4.6. Proposed Site of College of Veterinary Medicine and Veterinary Research Farm at North Dakota State University

11. The College of Agriculture has an agricultural experiment station and an animal research farm. In fiscal 1974, the biological research program involved 16.5 FTE faculty; $ 967,478 was spent on biomedical research.
12. The College of Agriculture offers a program for training animal technicians.
13. The Veterinary Science Department has 9 FTE, DVM faculty, 1 FTE, non-DVM faculty.
14. A diagnostic laboratory with expenditures of $35,000 per professional staff member is available for teaching veterinary students.

Disadvantages:

1. The University is 504 miles by auto from the geographic center of the OWR.
2. In a 10,000 square mile area around the University and within the state there is an inadequate supply of cats, horses, dairy cattle, poultry, and zoo animals.
3. The University dormitories are filled so University housing is not adequate for veterinary students; they must compete for limited existing private housing.
4. The existing library facilities cannot accommodate the veterinary medical students and faculty; no space can be assigned. The proposed new library is not funded.
5. The University's power plant is not adequate to add a CVM.
6. There is no medical college in NDSU. The nearest medical college, located 80 miles distant at the University of North Dakota at Grand Forks, has no joint programs with veterinary science. There are no colleges of dentistry or public health in the University.
7. The College of Agriculture does not have a centralized animal resources laboratory to serve the entire University.

8. There are no programs in: veterinary extension, continuing education in 1975 (in prior years a two-day short course has been given), M.S., Ph.D., and residency and internship education.
9. State support for veterinary medical research is low.

South Dakota State University

Brookings, South Dakota

Advantages:

1. The University has a high degree of interest in developing a regional CVM.
2. In a 10,000 square mile area around the University and within the state, there is an excellent supply of beef cattle, hogs, sheep and goats, and poultry. The numbers of dairy cattle and dogs are adequate.
3. The University will assign 45 acres of campus land to the proposed CVM. The area is of optimal terrain and good elevation in relation to campus buildings. The proposed research farm is located so animal research will not be a nuisance (See Figures 4.7 and 4.8).
4. The site is easily accessible by air. Brookings Airport is two miles, five minutes driving time, from the University. Automobile and trucks have access via two federal and two state highways.
5. The site for the CVM is within 10 minutes walking time of other campus buildings.
6. The housing supply is adequate for single students in the CVM.
7. The University is 211 miles from the nearest existing CVM in St. Paul, Minn., an adequate distance to avoid overlapping functions.
8. A new general library is under construction and can assign space, 5,000 square feet, to accommodate all of the veterinary medical library. However, computer based services are limited.
9. The following support services are available: computer, recreation, student health.
10. There are colleges of agriculture and pharmacy and a medical technology program in the University.

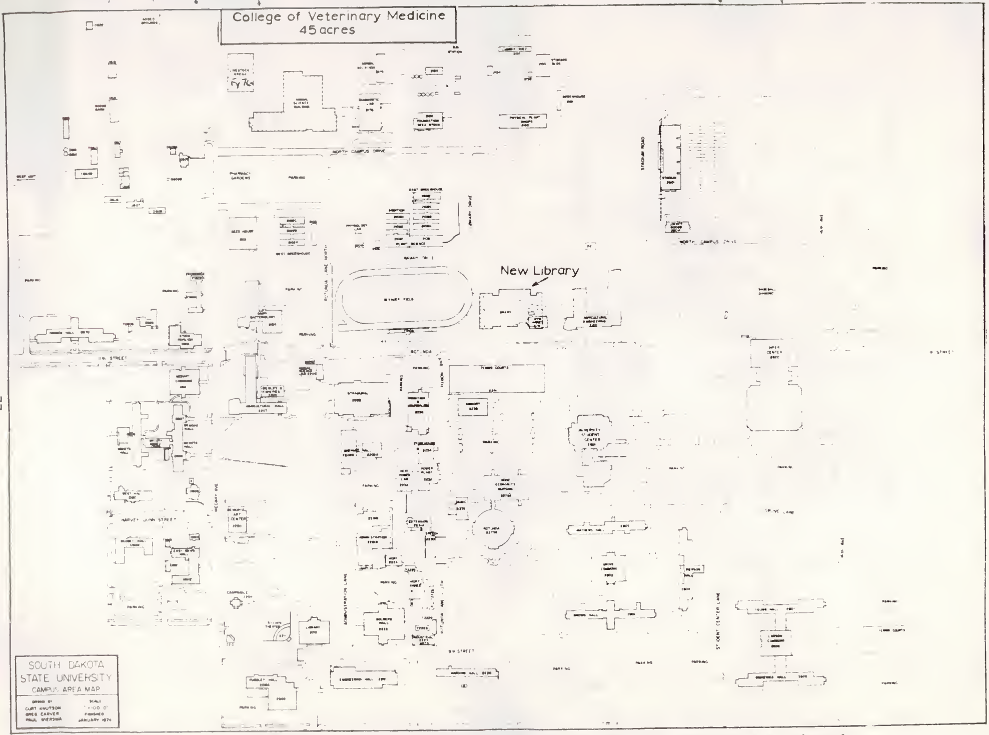


FIGURE 4.7. Proposed Site of College of Veterinary Medicine at South Dakota State University

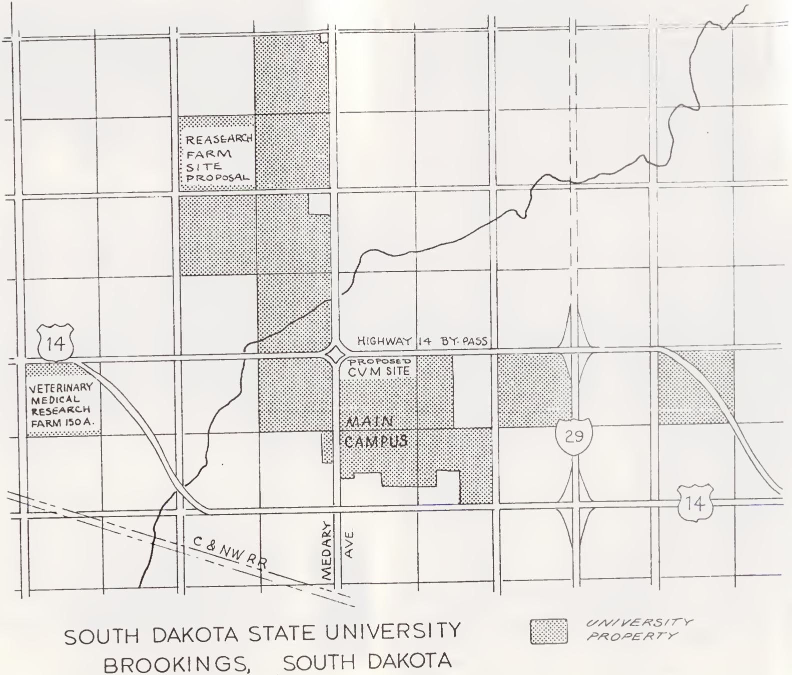


FIGURE 4.8. Proposed Site for Veterinary Medical Research Farm at South Dakota State University

11. The legislative climate is supportive of a CVM; veterinarians in the state give enthusiastic support to a CVM.
12. There are an adequate number of satellite facilities available to enhance veterinary education and research. (See Appendix E.)
13. The College of Agriculture offers a veterinary extension program (expenditures of $24,000 in fiscal 1974) and a continuing education program for veterinarians (5 days in 1975); it operates an animal research farm adjacent to the campus. The biomedical research program is modest compared to some other proposed sites. Expenditures in 1974 totaled $668,362 and involved 9.8 FTE faculty.
14. The Department of Veterinary Science offers a program in preveterinary medicine and has 7 FTE, DVM faculty and 7.5 FTE, non-DVM faculty.
15. A diagnostic laboratory with expenditures of $46,769 per professional staff member, is available for teaching veterinary students.

Disadvantages:

1. The University is located 364 miles by auto from the geographic center of the OWR.
2. The number of cats, horses, and zoo animals within a 10,000 square mile area around the University and within the state are low.
3. The institution will assign 150 acres of land for a veterinary research farm, but the CVM must purchase replacement land for the University.
4. University housing is not available for married students.
5. There is no medical college in SDSU. The nearest medical college, located at Vermillion, is 108 miles from Brookings and has no joint programs with veterinary science. The University has no colleges of dentistry or public health.

6. There is no division of laboratory animal research to serve the entire University.
7. The Department of Veterinary Science does not offer the following programs: animal technician training, M.S., Ph.D., and residency and internship education.
8. State support for veterinary medical research is low.

University of Wyoming

Laramie, Wyoming

Advantages:

1. The University has a high degree of interest in developing a regional CVM.
2. In a 10,000 square mile area around the University and within the state there are adequate numbers of sheep and goats.
3. The University will assign 50 acres of campus land to the CVM and 150 acres of land to the veterinary research farm. The elevation and terrain of both sites are optimal and both are located so animals will not be a nuisance. (See Figures 4.9 and 4.10.)
4. Brees Field located 6 miles, 10 minutes driving time, from the campus makes the site accessible by air. Cars and trucks have access via two federal highways.
5. The site of the CVM is within 10 minutes walking time from housing and relevant campus buildings.
6. Adequate units of University housing for single and married students is available for veterinary students.
7. Computer, recreation, and student health support services are adequate.
8. There are colleges of agriculture and pharmacy as well as a medical technology program in the University.
9. Support for the regional CVM is rated good for the legislature and moderate for the veterinarians in the state.
10. The Agricultural Experiment Station has vast acreage for animal research farms. In fiscal 1974, the Department of Agriculture and the Experiment Station expended $426,381 in biomedical research which involved 14.1 FTE faculty.

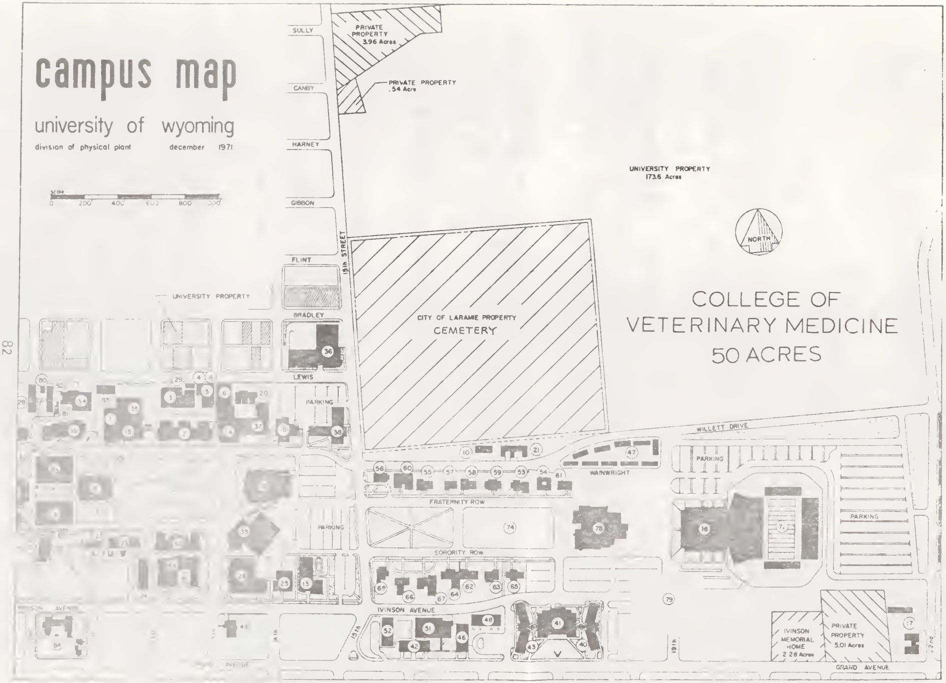


FIGURE 4.9. Proposed Site of College of Veterinary Medicine at the University of Wyoming

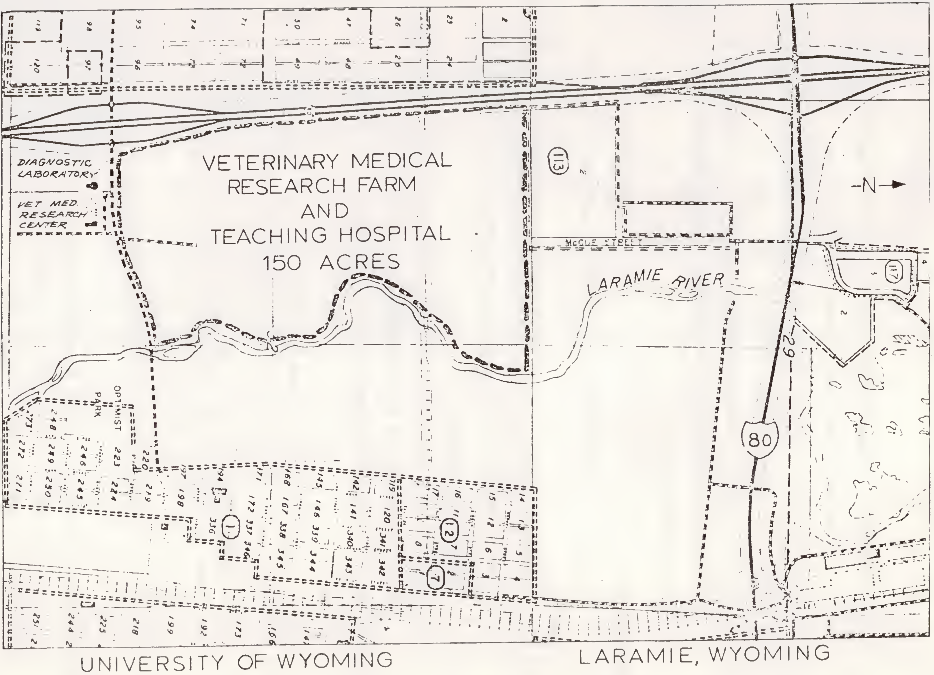


FIGURE 4.10. Proposed Site for Veterinary Medical Research Farm at the University of Wyoming

11. Educational programs offered by the Division of Microbiology and Veterinary Medicine include preveterinary medicine and Master of Science.
12. A diagnostic laboratory expended $43,000 per professional staff member in fiscal 1974, and is available for teaching veterinary students.
13. In fiscal 1975, there is budgeted $196,386 for veterinary medical research involving 4.54 FTE professional personnel in the Division of Microbiology and Veterinary Medicine.

Disadvantages:

1. The University is located 320 miles by auto from the geographic center of the OWR.
2. In a 10,000 square mile area around the University and within the state the numbers of beef cattle, dairy cattle, horses, hogs, poultry, zoo animals, dogs, and cats are inadequate.
3. The University is located 67 miles from the CVM at Fort Collins, Colorado; thus, an overlapping of functions can be expected.
4. The library has no computer based services and has no space to assign to a CVM.
5. Current capacity of the power plant is inadequate to serve CVM buildings.
6. The University has no funded colleges of medicine (planning funds only), dentistry, and public health.
7. Wyoming has few satellite facilities to enhance veterinary education. (See Appendix E.)
8. There is no centralized division of laboratory resources to serve the entire University.
9. The Division of Microbiology and Veterinary Medicine has only 2 FTE DVM's on the faculty and offers none of the following programs: veterinary

extension, continuing education in fiscal 1975, animal technician education (closest is Torrington, Wyo.), Ph.D., internship, and residency education.

DISCUSSION

The data revealed that each of the five universities had many strengths which might contribute to the success of a regional CVM. The departments of veterinary science already have baccalaureate programs in preveterinary medicine, as well as research and other programs which need not be duplicated in the proposed college. Federal, state, and private laboratories and animal resources were identified during the site visits which have great potential for serving aspects of the educational and research programs anticipated in the regional CVM.

The idea "that the OWR might best be served by a nucleus of a CVM located at the primary university with portions of the veterinary education and research programs located at the cooperating universities and satellite facilities" was explored with officials at each university. These discussions lead to the general understanding between the authors and officials of the five candidate universities that it will be feasible to locate the primary program, referred to as the nucleus of the CVM, at one university and portions of the program at the cooperating universities. This plan should capitalize on the strengths of the universities in the Region.

None of the five candidate universities are located near the geographic center of the Old West Region; therefore, all scored low on this criterion. When the five universities were evaluated on their distance from the population center of the Old West Region, low scores were received by Montana State University, North Dakota State University, and the University of Wyoming, while high scores were received by the University of Nebraska-Lincoln and South Dakota State University.

RECOMMENDATIONS

An objective method involving 60 criteria was used to select the optimal location for the nucleus of the CVM. On the basis of detailed and quantitative data, this study recommends that portions of the Northern Plains College of Veterinary Medicine be located at each of the participating universities with the nucleus located at the University of Nebraska-Lincoln.

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CHAPTER 5

ORGANIZATION OF PROGRAMS

It is the purpose of this chapter to evaluate the feasibility of the participation of five universities in an amalgamated program of veterinary education. The research involves primarily educational guidelines, educational technology, curricula, and courses currently available in the cooperating universities.

PRINCIPLES TO GUIDE DEVELOPMENT OF THE EDUCATIONAL PROGRAMS

Trends in veterinary medical education described earlier, as well as current learning theory, delineate the following principles to guide the creation and development of the educational programs:

1. Each student differs in his or her educational background, method, style and rate of learning.
2. A body of basic and clinical information (core) has been identified which is Indispensable for every veterinary student regardless of the branch of the veterinary medical profession he or she may enter in the future.
3. Learning takes place more efficiently and lastingly in an environment as nearly as possible like that in which it will be applied (1).
4. Relevance, coherence and continuity as well as reinforcement and consisitency are important design criteria for the curriculum.
5. Students need motivation so that they become life-long learners.
6. The environment should foster development by the student of desirable social, moral, and ethical values.

7. The effectiveness of a professional person is greatly influenced by the ability to communicate.

8. Learning objectives are specified for all modules of instruction.

9. Problem-solving ability should be emphasized in curriculum construction.

10. The design of educational programs needs flexibility so that students can expand their knowledge and skills in areas of interest.

11. Close student-faculty interaction should be encouraged.

Detailed curriculum matters are recognized as the responsibility of the faculty. However, for the purposes of general planning it is necessary to present one outline of an educational plan which is innovative, incorporates the essential educational principles, and also is compatible with the participation of five universities in the teaching program.

Accomplishment of the above demanding tasks will require departures from the traditional programs and organization of veterinary colleges.

DEPARTURES FROM TRADITIONAL VETERINARY COLLEGES

Development of a new college offers a rare opportunity to create unique programs and an organization which capitalizes on advances in communication and other technology, as well as contemporary learning and organizational concepts. In reference to technology in education, Alexander M. Mood in his study "Tke Future of Higher Education" (Carnegie Commission on Higher Education) stated:

> An improvement in technology reduces cost significantly with little or no decrease in quality, or increases quality with little or no increase in cost (2).

It is with the above axiom as well as clear educational objectives in mind that the following programs and methods are suggested for the Regional CVM.

1. Independent Study Program (ISP)

The quality of instruction can be enhanced by independent study which frees teachers to work with individuals or small groups of students. The first step in the development of the ISP is to determine the specific learning objectives for each module in the curriculum. Learning objectives delineate the major competencies students are expected to achieve; for example, factual information, mastery of concepts and skills in solving problems. In addition to specifying the learning objectives for each of the modules in the curriculum it is essential to determine the appropriate materials and methods for learning and the sequence of learning. Students are provided with the learning objectives and an autotutorial carrel. Students study printed material, 2 x 2 slides, motion films, radiographs, anatomical specimens, audio tapes, video cassettes, microslides, and all other learning materials essential for each module or submodule in the curriculum.

The general concept of independent study and its advantages to students was well expressed by Ben Green at the Education Research Center at the Massachusetts Institute of Technology:

> From the student's point of view, he (1) works at his own rate; (2) works when he wants to; (3) knows what he is responsible for; (4) can get personal help; (5) is not rushed past the hard parts; (6) is not held back on material he already knows; (7) gets over being afraid of tests; (8) knows where he stands; and (9) enjoys being actively involved

in learning instead of just listening to lectures .

Another advantage of ISP for students is the accessibility of faculty. Teachers are released from lectures and long laboratory periods and are available for tutoring students on a one-to-one basis. After mastery of one module the students may proceed to subsequent modules.

Aids to learning include books, journal articles, films, slides, television, and tapes plus periodic evaluation of progress. In addition, an important aspect of independent study is a well managed system for periodic self evaluation. An increasing number of medical schools provide their students with a computer-based system for tutorial self-evaluation.

Computer managed or computer assisted instruction will be described below because the technology is especially applicable to an independent study program of an interstate veterinary college.

2. Computer Assisted Instruction (CAI)

When the student feels that he has mastered the educational objectives of a submodule, he signs on the computer terminal for self-evaluation. The computer encounters the student with a question and then immediately evaluates his response. Correct answers receive a reinforcing type of feedback, while wrong answers trigger corrective feedback and another chance to respond to the question. The computer will also respond to unanticipated answers and attempt to coach the student. The computer dialogue alerts the student to deficiencies and presents study prescriptions which may include a faculty conference, audiovisuals, printed materials, clinical experience or laboratories. The computer tape records the student's responses and aids instructional management by providing a weekly report on the student's progress. Up-to-the-minute student status reports may be obtained at the computer terminal by any faculty member at any time.

The national CAI medical education network is used by medical institutions from coast to coast for sharing medical instruction and for achieving economy of scale by sharing costs. The official name of the organization is the Health Education Network Users Group (HNUG) of the Association for Development of Computer Based Instructional Systems.

In 1975, there were 48 institutions listed among members of the network users group (Appendix F). Forty users are accessing the CAI data base at The Ohio State University College of Medicine and 39 are accessing the "CASE" materials at Massachusetts General Hospital. According to the publication in the Journal of Medical Education by Kamp and Brigham, over 44 per cent of the available computer assisted instruction in medicine and health related areas resides at The Ohio State University (3). Since the above publication Pengov reported that the University of Illinois "CASE" materials have been added to the existing CAI data base in The Ohio State University College of Medicine, bringing the total to over 50 per cent (4). Pengov further reported that the CAI system at Ohio State

(a) provides 22 hours per day of service to students and health professionals throughout the United States;

(b) maintains a catalog of nearly 200 CAI interactive units;

(c) logs over 4,000 usage hours/month; and

(d) supports development of new CAI course materials at the rate of two to four student interactive hours per month (4).

The learning objectives of each primary module in the independent study program at The Ohio State University College of Medicine were reviewed for applicability to the DVM program. The modules concerned with cell structure and function, and biostatistics is appropriate for veterinary medical students. Portions of the modules concerned with genetics, nutrition, microbiological mechanisms, pathologic mechanisms, drug mechanisms, and body systems can serve as the starting point for veterinary faculty to modify the programs to serve the DVM curriculum.

The University of Nebraska, as a member of the Health Education Network Users Group, is accessing Ohio State's and Massachusetts General Hospital's computer based programs. According to Mr. Thomas Gildea, Systems Analyst at UN Medical Center, if the Regional CVM is centered at Lincoln it is feasible for veterinary students and faculty to access existing and author new computer based programs. In fact, as the number of users increase the cost per hour decreases. The Regional veterinary college might install terminals at each of the departments of veterinary science in the five cooperating universities for the following purposes:

(a) manage instruction of first year veterinary students;
(b) assure coordination and unification of the program;
(c) provide quality control through a computer based tutorial evaluation system used by all students;
(d) link the fourth year blocks of instruction, especially the externshipportion, throughout the Region;
(e) extend continuing education to each cooperating state;
(f) provide storage and retrieval of data for the diagnostic laboratories, extension service and research programs; and
(g) open opportunities to mutually share computer managed independent study programs when they develop in other veterinary colleges in America.

3. Teaching and Consultation by Two-way Color Satellite Communication

The feasibility of medical teaching and consultation by satellite communication was tested in a cooperative venture between NASA, the Lister Hill Center for Biomedical Communication of the National Library of Medicine, other agencies of the Department of Health Education and Welfare, and 23 experimenters including the University of Washington and the University of Alaska (WAMI Program).

In May 1974, the NASA Applications Technology Satellite (ATS-6) was placed in stationary orbit 22,300 miles above the equator with an elliptical footprint (area receptive to satellite communication) favorable for broadcasts between the States of Washington and Alaska. Full duplex audio and color video broadcasts between faculty in Washington and medical students and faculty in Alaska were successful between September 1974 and May 1975. Students at the University of Alaska not only participated in classroom discussions but also interviewed patients at the University of Washington School of Medicine. In addition, physicians in the two states were able to telecast disease conditions of patients and engage in consultation (5).

Collaboration between the governments of Canada and the United States will result in the launching of a Communications Technology Satellite in December 1975, or January 1976. This satellite will be available three days a week to each country. The Lister Hill National Center for Biomedical Communications of the National Library of Medicine has tentatively requested nine hours per week for health-related applications. The satellite will be capable of blanketing the entire continental United States. It will have two movable "footprints", each of which will cover approximately one-third of the Nation at a time (6,7).

By the time the Regional veterinary college is opened it is likely that two-way audio and color video communications among the five cooperating universities will be feasible. This development will increase the feasibility of a) a unified DVM program, b) an advanced continuing education (CE) program, c) unlimited consultation between faculty and practitioners, and d) linkage of veterinary diagnostic laboratories, research programs, and extension services.

4. A Modular Doctor of Veterinary Medicine Curriculum

Consideration of alternate programs and technological advances led to the conclusion that the following outline of the DVM curriculum will most nearly be in accord with the principles outlined at the front of this chapter. An outline of one version of a modular curriculum designed for greatest compatibility with an independent study program is presented in Table 5.1. This modular program allows students some latitude in their rate and mode of learning and in their selection of areas of emphasis. Under the modular system, the learning objectives are specified and the learning resources are developed for each module and submodule of the program. Mastery of a module and its submodules is expected before students proceed to subsequent modules. The use of the term "year" is merely a convenience for the reader. In actual practice, the rapid learners may complete all modules of the "first year or phase" in 8 months while other students may study during semester or quarter breaks and utilize up to 10 months to complete the work. The third and fourth years represent a 21-month, year-round program emphasizing clinical disciplines followed by rotation in a selective block system.

The third year represents a transition from the modular independent study program to clinical clerkships and externships. Minimal clinical experience starts at the beginning of the first year in a module designated "Introduction to Veterinary Medicine." Clinical experience gradually increases throughout the curriculum until the final 12-month period when clinical blocks occupy most of the student's time.

TABLE 5.1 Outline of Primary Modules in the Doctor of Veterinary Medicine Program.

FIRST YEAR - THE NORMAL ANIMAL (8-10 Months)

Module 1. Comparative Molecular and Cellular Biology

Module 2. Comparative Structure and Function

Module 3. Metabolism and Bioenergetics

Module 4. Introduction to Veterinary Medicine (concurrent with modules 1,2 and 3)

Note: each module, except number four contains submodules.

SECOND YEAR - CAUSE, EFFECT AND CONTROL OF DISEASE (8-10 Months)

Module 5. Microbiologic, Pathologic, and Drug Mechanisms

Module 6. Pathoblology of all Organ Systems

Module 7. Clinic Rounds and Physical Examination

Note: each module, except module number seven contains submodules.

THIRD YEAR - THE ABNORMAL ANIMAL (Third and Fourth years represent a 21 -month, year round program emphasizing clinical disciplines followed by rotation in a selective block system)

Surgery

Radiology

Ophthalmology

Cardiology

Anesthesiology

Neurology and Behavior

Gastroenterology

Urology

Therlogenology

Endocrinology

Dermatology

Diatetics

Clinical Pathology

Core Clinical Clerkships

FOURTH YEAR - SELECTIVE BLOCK SYSTEM
(Twelve consecutive months of concentrated study in required and selective blocks each of 2-8 weeks duration, including externships each 2-4 weeks in duration)

Examples of Blocks:

Food Animal Practice (herd health, beef cattle, dairy cattle, sheep, swine, poultry)

Equine Practice

Urban Practice

Laboratory, Zoo,and Aquatic Animal Medicine

Public Health

Clinical Disciplines (18 areas)

Basic Medical Sciences (may be taken conjointly with graduate degree program)

Free Electives

Rationale for Choice of Curriculum

The 22 American veterinary medical colleges (United States and Canadian) all require at least four years of education in the DVM program except for those at Michigan State University and Texas A & M University which have an accelerated three-year, year-round program. In the interest of developing a DVM educational program of the highest quality and enabling five universities to participate in teaching, it is recommended that a four-year curriculum be developed by the CVM.

Subject matter relative to the normal animal is concentrated in the first year. This strategy will enable each of the cooperating universities to fit existing expertise into the appropriate modules and prepare students for the second year. The course "Introduction to Veterinary Medicine" will consist primarily of demonstrations by veterinarians in varied fields of practice plus instruction concerning the social, ethical, economic and professional aspects of practice.

The second year considers the cause, effects and control of disease and encourages horizontal as well as vertical integration of subject matter. Integration of medical sciences promulgates correlation of the disciplines. Relevancy of the course content is enhanced by (a) participation of surgeons, internists, radiologists and other clinical specialists in addition to faculty in the preclinical disciplines and (b) greater contact with animal patients than was provided in the first year.

At the beginning of the third year students begin a 21-month, year-round program (continuing through the fourth year) involving each of the clinical disciplines and a selective block system. The abnormal animal is considered by each of the clinical disciplines. Students select their sequence of blocks of instruction varying from 2 to 8 weeks in duration which provide concentrated learning in important areas of veterinary medical service. This strategy encourages students to return to their home state for one or more blocks of instruction.

Throughout the five states, veterinarians in practice and other areas of professional service may serve as preceptors in the externship program.

Externs are pre-DVM students who receive part of their education off campus under the direction of veterinarians who offer essential educational experiences different from those available at the CVM. For example, externships may be required or elected in the following areas: cow-calf herd health, feeder cattle, dairy cattle, horses, swine, poultry, sheep, zoo animals, laboratory animals, marine animals, veterinary public health, food hygiene, and environmental health.

Externships will add dimensions of education not available at the teaching hospital. If an externship is taken near a student's home university, he or she may wish to register for free electives. The selective block system and free elective time provides students with an opportunity to make an informed career choice by realistically sampling many areas in the profession. Externships may prove to be the most important single strategy to cause graduates to a) enter rural food animal practice and b) practice in underserved areas. Students desiring to pursue a post-DVM degree may select blocks of instruction and free electives in his area of interest.

The American Veterinary Medical Association Council on Education has withheld full accreditation of veterinary colleges which have excessive numbers of students in relation to the number and variety of animal patients available for clinical instruction. This frequent deterrent to quality education is surmounted by the large number of food animals, horses and other important species in the five states which will provide abundant material for clinical instruction. The modular curriculum with its selective block system and externship program for clinical instruction will capitalize upon the availability of the enormous number and variety of potential animal patients in the Region. Students can be assured of blocks of concentrated study involving all major animal health problems.

5. Inventory of Courses at Five Universities

An inventory was made of courses of instruction which may be part of the DVM or graduate curricula of the Regional college. The courses also identify faculty expertise for development of independent study programs. Data was collected by (a) visits to each of the five cooperating universities and (b) searching the course offerings listed in the university bulletins. Lists of relevant courses were mailed to the chairman of each department of veterinary science for verification.

Montana State University

The inventory, shown in Table 5.2, indicates that Montana State University (MSU) is currently offering nearly all of the courses planned for the first year of the DVM program. The courses were designed for 20 first-year medical students enrolled in the first year of medical school at MSU. These courses with minor adjustments have contents appropriate for first-year veterinary students. Dr. Franklin S. Newman, Coordinator of Medical Instruction, indicated that Montana's veterinary students (9 to 18 per class) could, with some adjustments and by scheduling larger classrooms, take appropriate courses with the medical students. It is understood that two adjustments are required: (a) terminal portions of several courses might diverge into human and animal pathways and (b) clinical demonstrations separate from the medical students must be provided for veterinary students.

In addition to the medical school courses, MSU offers courses in veterinary sciences which may serve the graduate curricula and the first year, and one quarter of the fourth year, of the DVM program of the veterinary college.

University of Nebraska - Lincoln

The inventory lists courses offered by the Department of Veterinary Science and other departments in the University which may serve a large portion of the first year and three months of the fourth year of DVM program. In addition graduate courses offered by Veterinary Science and other departments in the Graduate College may serve as electives for the DVM and graduate curricula.

North Dakota State University

Eight courses in the Department of Veterinary Science and 16 courses in other departments may serve the first year and one quarter of the fourth year DVM program. In addition numerous courses may be used by the graduate curricula of the Regional College. A new course, "Introduction to Veterinary Medicine," and modifications or integration of existing courses will be required for the first year of the DVM program.

South Dakota State University

Nine courses were identified university-wide which may serve the first year and three months of the fourth year of the DVM program or the graduate curriculum. Modification of existing courses and new courses will be required.

University of Wyoming

Eight courses offered by the Division of Microbiology and Veterinary Medicine and 15 courses offered by other departments may serve part of the first year and three months of the fourth year of DVM program and part of the graduate curricula of the CVM. The University has received funds from the State of Wyoming for planning a medical school. When the medical school curriculum is planned, the University of Wyoming may wish to enroll medical and veterinary medical students conjointly during a large portion of the first year of their respective programs.

Table 5.2 Inventory of Courses Which, With Limited Modification, May Serve Programs in the Regional College of Veterinary Medicine.

MONTANA STATE UNIVERSITY

Courses in Veterinary Science

VetS 500	Seminar
VetS 530	Techniques for Research with Experimental Animals
VetS 570	Individual Problems
VetS 580	Special Topics
VetS 589	Graduate Consultation
VetS 590, 690	Master's and Doctoral Thesis

Courses Jointly Serving Medical and Veterinary Medical Students

MedS 512	Mechanisms In Physiology and Pharmacology
MedS 513	Introduction to Clinical Medicine I
MedS 514	Molecular and Cellular Biology I
MedS 533	Medicine Health and Society
MedS 520	Cell and Tissue Response to Injury
MedS 521	Natural History of Infectious Diseases
MedS 524	Molecular and Cellular Biology II
MedS 534	Endocrine System
MedS 530	Epidemiology
MedS 532	Nervous System
MedS 580	Special Topics

UNIVERSITY OF NEBRASKA - LINCOLN

Courses in Veterinary Science

813	Physiology of Domestic Animals
814	Physiology of Domestic Animals
816	Avian Diseases
899	Master's Thesis
901	Diagnostic Techniques
903	Veterinary Parasitology
904	Veterinary Parasitology
905	Advanced General Pathology
909	Seminar
910	Advanced Systemic Veterinary Pathology I
911	Advanced Systemic Veterinary Pathology II
996	Research on Selected Problems in Veterinary Science

Courses in Other Departments

Ani. S. 821	Principles of Nutrition
Ani. S. 831	Advanced Animal Breeding
Ani. S. 841	Reproductive Physiology in Domestic Animals
Ani. S. 842	Endocrinology
Ani. S. 843	Physiology of Lactation
Zool. 905	Advanced Cell Biology
Zool. 842	Physiology of Domestic Animals
Zool. 860	Comparative Physiology

Courses in Other Departments (cont'd)

BN 901	Metabolism of Carbohydrates
BN 903	Metabolism of Lipids and Steroids
BN 904	Mechanisms of Biochemical Regulation
Micro. 808	Immunology
Micro. 903	Viruses
Plty. S. 842	Avian Biology

NORTH DAKOTA STATE UNIVERSITY

Courses in Veterinary Science

341	Anatomy and Physiology
342-343	Preventive Veterinary Medicine
402	Avian Diseases
410	Animal Virology
420	Clinical Parasitology
430	The Zoonoses
596	Special Topics
597	Research

Courses in Other Departments

Ani. S. 507	Care and Feeding of Experimental Animals
Ani. S. 523	Advanced Nutrition of Ruminants
Ani. S. 524	Advanced Nutrition of Non-Ruminants
Ani. S. 526	Advanced Animal Genetics
Ani. S. 528	Advanced Physiology of Reproduction
Ani. S. 532	Reproductive Endocrinology
Biochem. 586	Carbohydrates
Biochem. 587	Proteins
Biochem. 589	Lipids
Biochem. 595	Metabolism
Entomol. 511	Medical Entomology

Courses in Other Departments (cont'd)

Zool. 362	Mammalian Physiology
Zool. 411	Cytology
Zool. 443	Avian Biology
Zool. 461	Cellular Physiology
Zool. 463	Endocrinology

SOUTH DAKOTA STATE UNIVERSITY

Courses in Veterinary Science

VetS 590-690	Problems in Veterinary Science

Courses in Other Departments

Ani. S. 711	Ruminology
Ani. S. 721	Animal Nutrition
Ani. S. 732	Advanced Physiology of Reproduction
Chem. 562-662	Principles of Biochemistry
Zool. 523-623	Advanced Systemic Physiology
Zool. 525-625	Advanced Systemic Physiology
Zool. 527-627	Endocrinology
Micro. 524-624	Virology

UNIVERSITY OF WYOMING

Courses in Microbiology and Veterinary Medicine

Vet. H. 610	Laboratory Animal Care and Management
Vet. H. 611	Veterinary Elements
Microbi. 505D	Pathogenic Microbiology
Microbi. 604	Immunology
Microbi. 641	Introductory Virology
Parasit. 631D	Introduction to Veterinary Parasitology
Microbi. 852	Medical Mycology
Microbi. 609M	Microbial Genetics

Courses in Other Departments

Biochem. 801	Biochemistry Lipids
Biochem. 803	Biochemistry of Carbohydrates
Biochem. 804	Biochemistry of Amino Acids and Proteins
Biochem. 820	Structure and Function of Biomembranes
Ani. S. 816	Advanced Animal Nutrition
Ani. S. 840	Advanced Reproductive Physiology
Zool. 620D	General Cell Physiology
Zool. 621D	General Cell Physiology
Zool. 823	Cardiovascular Physiology
Botany 660D	Cell Structure and Function
Zool. 824	The Physiology of Respiration
Zool. 826	Endocrinology

Courses in Other Departments (cont'd)

Zool. 827	Cellular Physiology
Zool. 634D	Developmental Biology and Embryology
Food S. 556D	Meat Processing

ORGANIZATION OF REGIONAL PROGRAMS OF EDUCATION AND SERVICE

Organization of the Doctor of Veterinary Medicine Degree Program

Alternative patterns ranging from nearly equal amounts of instruction in the DVM program at each of the five cooperating universities to instruction exclusively at one university were evaluated. Each of the universities have an excellent preveterinary medicine program which must also be considered in the development of a plan for the DVM program. Interviews of officials at the five campuses revealed that the duration of the preveterinary program is a function of repeated attemps to gain admission to a CVM rather than the fulfillment of educational prerequisites.

A total of 1676 students was admitted to the DVM program in the U.S. veterinary medical colleges in 1974. The intense competition among the applicants for admission to veterinary medicine caused delays in acceptance of the applicants. For example, students may apply for 2, 3, or 4 years before they are finally accepted into veterinary medicine. Table 5.3 shows the number of years of preveterinary education taken by students admitted to the U.S. colleges of veterinary medicine in 1974. Analysis of the characteristics of the 1974 entering classes show that 61 per cent of the students admitted had 4 or more years of preveterinary medical education. Thirty-six per cent had completed 4 years of preveterinary medical education while 18 per cent had five years and 7 per cent had six or more years of preveterinary education. A study of the data suggests that in the new college, efforts should be made to achieve high quality veterinary education with the minimum number of years of university work.

Table 5.3. Years of Preveterinary Education Taken by Students Admitted to U.S. Veterinary Colleges in 1974.

Years of Preveterinary Education	Students	
	Number	Per Cent
2	218	13
3	446	26
4	604	36
5	299	18
6 or more	109	7
Total	1676	100

Table 5.4 presents a plan for providing high quality professional education in the minimum number of years. According to this plan, preveterinary medicine is completed in three academic years (averaging nine months) at each of the five universities. The preveterinary program is treated as a continuum with the DVM program. According to the plan, students are admitted to the Regional veterinary college after three years of preveterinary medicine and continue their first year in the DVM program at their home universities. The second and third years and nine months of the fourth year of the DVM program are taken at the University of Nebraska-Lincoln. Three months of the fourth year are taken at or under the direction of the university in the students' home states. Since graduates tend to locate where they receive their terminal clinical education this phase of the program may improve the geographic distribution of veterinarians.

The plan further proposes that the B.S. degree be awarded by the home university upon the completion of its requirements after three years in preveterinary medicine and one year in the Regional CVM.

TABLE 5.4 Distribution of Preveterinary Medicine and Doctor of Veterinary Medicine Instructional Programs

Year in Program	MSU (months)	UN-L (months)	NDSU (months)	SDSU (months)	UW (months)
		Admission to Preveterinary Medicine Program*			
Year 1	9	9	9	9	9
Year 2	9	9	9	9	9
Year 3	9	9	9	9	9
		Admission to Regional College of Veterinary Medicine**			
Year 1	9	9	9	9	9
Award B.S. Degree	x	x	x	x	x
Year 2		9			
Year 3		9			
Summer	3***	3***	3***	3***	3***
Year 4		9****			

* Preveterinary medicine usually takes four years.

** 150 semester credit hours in DVM program; average semester hours of credit among 20 North American Colleges of Veterinary Medicine is 152.9 (8).

*** Externship program and elective courses.

**** Clinical education blocks.

Organization of Post-DVM Programs

Opportunities for all post-DVM programs will be expanded when the CVM is operational. It is anticipated that existing M.S. and Ph.D. degree programs will continue and will be enhanced by the availability of new faculty and new research projects representing fields of veterinary medicine which are not developed in the five Old West universities. New graduate programs may develop along with the varied faculty expertise. Free movement of graduate students among all departments of the College of Veterinary Medicine, including the present Departments of Veterinary Science in the five universities, should be encouraged. The barrier of nonresident fees can be removed by treating residents of each of the five states as residents of the CVM; thus, students pay only resident fees to the university where they are enrolled during a given semester or quarter.

Candidates for certificates of internship and residency should, like other students in the Regional CVM, be encouraged to participate in portions of programs that are developed in each of the five states.

Students in continuing education likewise are encouraged, according to the above pattern, to enroll in courses at each of the five universities. It is anticipated that programs will be developed by collaboration of all departments in the CVM, including all Departments of Veterinary Science, in concert with the veterinary medical associations in each of the five states. Such cooperation should provide assurance that CE courses will be relevant to the needs of veterinarians in the Region.

A large number of high quality CE programs, exceeding the requirements for relicensure are demanded by veterinarians in the Region. Therefore, it is essential for continuing education to be a college function of high priority. No geographic area or veterinary association is too remote from the CVM to receive CE programs by college visiting faculty, television, telelecture, and packaged slide-tape minicourses. Potential applications of technologies such as computer assisted instruction and television via satellite have been discussed in an earlier section.

An educational principle, that individuals learn best when pertinent information is presented at the time the problem is most pressing, can be exploited by the diagnostic and referral services. Information communicated to practitioners by faculty to solve new and unusual problems, in response to the referral of patients or specimens, is an unexcelled aspect of continuing education.

Organization of Diagnostic and Patient Referral Service

A large number of college faculty, representing all of the recognized veterinary medical specialties, will be an enormous asset not only to continuing education but also to the diagnostic and patient referral services in the entire Region. The existing diagnostic laboratories in each state can expect to continue their vital services. Additional faculty specialists required by the first year of the DVM program at each university should enhance the spectrum of technical expertise for solution of diagnostic problems.

A network for storage and retrieval of data useful to all five diagnostic laboratories can be developed by the CVM (see previous section on communication technology). Linking the diagnostic laboratories into a Regional information exchange network can provide fast and highly reliable diagnostic service for the entire Region.

Referral service is an essential Regional program. Solution of unusual and new livestock disease problems often, in the judgment of practicing veterinarians, require the concerted effort of a team of faculty specialists with their sophisticated technicians, laboratories and equipment. Referral of patients to the veterinary teaching hospital by practitioners provides the back-up assistance which is not currently available in the Region. The economic benefits to the livestock industry derived from referral services is sufficient justification for establishing the Regional CVM.

Faculty at the teaching hospital regularly report (usually by telephone) all findings on referred patients to the referring veterinarian. Upon satisfactory resolution of the problem the referred patient is returned to the care of the referring veterinarian; thus, clients of the practitioner remain his clients.

The daily solution of problems encountered by practicing veterinarians along with the one to one practitioner-faculty interchange is truly the most effective form of continuing education which has been devised. Furthermore, problems encountered in referred patients suggest topics for creation of urgently needed CE programs for dissemination throughout the Region. Referral services also provide the faculty with a wide variety of animal species with a large number of disease problems for use in teaching students. It is recommended that referral policies be developed jointly by the practicing veterinarians and the faculty.

Organization of Veterinary Extension Programs

The ongoing veterinary extension programs in each of the five states should benefit from the CVM. The availability to the Extension Service of a large number of faculty representing all of the recognized veterinary medical specialties should add diversity to the programs. Linkage of the diagnostic laboratories, referral service, and investigational programs into an informational network is recommended. This storage and retrieval system will provide a new source of current and often emergency information for use in the extension program. For example, measures for preventing transmission of St. Louis encephalitis from horses to people, or alerting areas to new herd health programs call for a technology based extension service.

In addition to communication through the above informational network, faculty specialists may conduct extension programs by telelectures, slide-tape minicourses, videotapes, and possibly by two-way audio and video telecasts via communications satellite as technology is developed.

The Veterinary Investigational Programs

The ongoing veterinary research programs need not be changed when the CVM opens. The availability of a larger number of faculty specialists in the Region should enable the Region to attract higher levels of research funding from federal, foundation, and private sources. Not only greater visibility but also united efforts of more veterinary scientists should increase the research funding of the present Departments of Veterinary Science. This report recommends that veterinary scientists in the Region with common research interests be assured of maximum freedom to develop joint research proposals.

RECOMMENDATIONS

Principles were identified which guided the development of educational programs. Departures from traditional veterinary colleges include an independent study program, computer assisted instruction, two-way audio and color video telecasts via Communications Technology Satellite, a modular curriculum, externship program, and utilization of faculty expertise and courses at five universities. Strategies to improve the maldistribution of veterinarians are incorporated.

This study recommends that the Regional veterinary college design its educational program as a continuum including preveterinary medicine, the DVM degree program, and continuing education. It is further recommended that (a) students be admitted to the DVM program after the equivalent of three years of preveterinary medicine (b) continue their first year in the DVM program and receive the B.S. degree at their home universities, (c) complete years two and three and nine months of the fourth year at the University of Nebraska-Lincoln and (d) take three months of the 12-month fourth year under the direction of the university in the student's home state.

It is recommended that the curriculum at each participating university be similar and compatible with emphasis upon integration of the comparative medical sciences.

It is recommended that quality control of veterinary instruction among the five institutions be achieved by providing a computer based Tutorial Evaluation System for students.

This study recommends that final and detailed decisions concerning the curriculum be the responsibility of the faculty.

This study recommends that the programs be of good quality so as to exceed the minimum requirements for accreditation of the college.

It is recommended that the proposed college give high priority to continuing education.

In the interest of utilizing all potential expertise in providing services, it is recommended that the Regional veterinary college link the diagnostic laboratories, referral services, and extension service into a Regional information exchange network. The curriculum strategy, offering all of the first year of instruction and one quarter of the clinical instruction in the student's home state, should encourage graduates to locate in food animal practice in rural areas; thus tending to correct the maldistribution of veterinarians.

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CHAPTER 6

GOVERNANCE AND ADMINISTRATION

Higher education is today the target of growing pressure for improved management capability. Accountability is changing so as to focus on both elements of the cost-benefit equation. Not only must stewardship obligations be met; the provider of funds is demanding an assurance that desirable benefits are derived from the resources invested. It is the objective of this chapter to develop and present a feasible plan for administration and governance of the Regional CVM.

GOVERNANCE

Ideally, each participating university will be equitably involved in governance.

It is proposed that the Regional college of veterinary medicine shall have a Board of Trustees with equal representation from each of the governing bodies of the five participating universities. The Board of Trustees shall have five members; one representing Montana State University, one representing the University of Nebraska-Lincoln, one representing North Dakota State University, one representing South Dakota State University, and one representing the University of Wyoming. The trustee representing the University of Nebraska-Lincoln shall serve as Chairman and be a voting member. The Chancellor and Vice Chancellor (agriculture and natural resources) of the University of Nebraska-Lincoln shall serve as ex officio but shall not vote. The method used by the governing body of each participating university to select its representative to the Board of Trustees of the Regional veterinary college is left to the governing body's discretion.

The above proposal is intended to provide equal representation and voting privileges for each participating university. Designation of the Trustee representing the University of Nebraska as Chairman (a) promotes frequent and convenient communication with the Chancellor and (b) gives cognizance to the fact that the State of Nebraska bears a large financial responsibility for the veterinary college.

In evaluating the composition of the Board of Trustees, consideration was given to two or more representatives from each of the governing boards of the participating universities. After weighing the relevant factors such as (a) the rather small size of the Regional CVM compared with other colleges in the university, (b) the travel expense and time required for each Trustee to participate in meetings of the Board, and (c) the relative effectiveness of five Trustees versus ten or fifteen in decision making, it was concluded that the maximum cost-benefit will be achieved by five Trustees. To assure representation of each participating university at all meetings of the Board of Trustees, it is recommended that each governing body designate an alternate as well as a primary Trustee.

ADMINISTRATION

Figure 6.1 presents a suggested plan for administrative organization of the proposed college. This proposal addresses the fundamental functions of management: planning, organizing, actuating and controlling. These

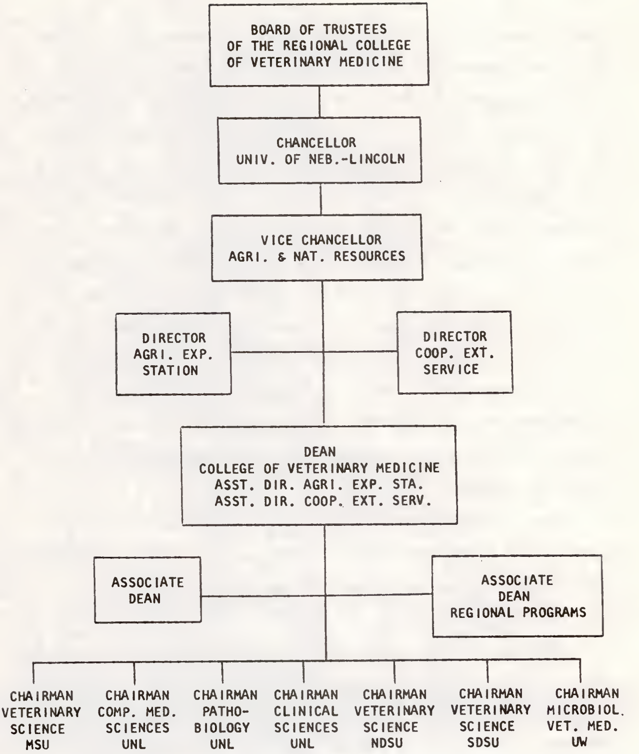
BOARD OF TRUSTEES OF THE REGIONAL COLLEGE OF VETERINARY MEDICINE
CHANCELLOR UNIV. OF NEB.-LINCOLN
VICE CHANCELLOR AGRI. & NAT. RESOURCES
DIRECTOR AGRI. EXP. STATION
DIRECTOR COOP. EXT. SERVICE
DEAN COLLEGE OF VETERINARY MEDICINE ASST. DIR. AGRI. EXP. STA. ASST. DIR. COOP. EXT. SERV.
ASSOCIATE DEAN
ASSOCIATE DEAN REGIONAL PROGRAMS
CHAIRMAN VETERINARY SCIENCE MSU
CHAIRMAN COMP. MED. SCIENCES UNL
CHAIRMAN PATHO-BIOLOGY UNL
CHAIRMAN CLINICAL SCIENCES UNL
CHAIRMAN VETERINARY SCIENCE NDSU
CHAIRMAN VETERINARY SCIENCE SDSU
CHAIRMAN MICROBIOL. VET. MED. UW

FIGURE 6.1 Suggested Organization Chart for the Regional College of Veterinary Medicine

four functions are inextricably interwoven and interrelated. Vertical levels of organization, shown in the organization chart, build from seven departmental Chairmen who represent the faculty, to the Associate Deans and Dean, the Vice Chancellor, Chancellor and Board of Trustees.

Clear channels of communication are established for administration of academic programs. In addition, there is a simple mechanism for the administration of research and extension programs. Designation of the Dean of the college as Assistant Director of the Agricultural Experiment Station and Assistant Director of the Cooperative Extension Service is proposed as the coordinating link between research and extension in the veterinary college and the Director of the Agricultural Experiment Station and the Director of the Cooperative Extension Service.* This arrangement should assure collaboration of veterinary faculty with faculty in other colleges in the agricultural research and cooperative extension programs.

In view of the demands for leadership and coordination, imposed upon the CVM by the participation of five universities, an Associate Dean for Regional Programs is designated in the organization chart.

It is proposed that the Department of Veterinary Science (Microbiology-Veterinary Medicine at the University of Wyoming) at each of the participating universities serve in the dual role as a department in the CVM. The exception is at the University of Nebraska-Lincoln (UNL) where three departments will be required (Comparative Medical Sciences, Pathobiology and Clinical Sciences). The present Department of Veterinary Science at UNL may continue as a research and graduate department with joint faculty appointments in the CVM or it may expand and reorganize into the three departments named above. If the decision is made to retain the present strong Department of Veterinary Science at UNL when the CVM opens, it seems logical that it be added to the organization chart.*

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*The Dean of the CVM should also have linkage with the Experiment Stations and Extension Services at MSU, NDSU, SDSU and UW.

In summary, the proposed organization is conceived to promulgate management by objectives, effective communication, decentralization, and an harmonious administration which is flexible and responsive.

Committees

Participation of faculty at each cooperating university in committees of the CVM must also be assured.

An Admissions Committee is appropriate in each participating Department of Veterinary Science. Each Committee shall evaluate applicants from its respective State and certify to the Chairman of the Department of Veterinary Science, who shall certify to the Dean of the CVM, those individuals who are selected to fill the State's quota in the first year class. The Chairmen of each of the five Admissions Committees shall convene as a CVM Admissions Committee chaired by the Associate Dean for Regional Programs.

A Standards Committee and a Curriculum Committee shall each have one representative from each Department in the CVM, with the Associate Dean (Academic Affairs) of the College serving as Chairman of both committees. Since each Department of Veterinary Science is a Department in the CVM, each of the five participating universities are represented on the Standards Committee and on the Curriculum Committee.

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* The Department may choose to replace the proposed Department of Pathobiology shown in the chart.

RECOMMENDATIONS

This study recommends that the Regional college of veterinary medicine be governed by a Board of Trustees with equal representation from each of the governing bodies of the five participating universities. The Board of Trustees shall have five members; one representing Montana State University, one representing the University of Nebraska-Lincoln, one representing North Dakota State University, one representing South Dakota State University, and one representing the University of Wyoming.

It is recommended that administration of the Regional college be the responsibility of the Chancellor of the University of Nebraska-Lincoln, the Vice Chancellor, Dean of the College of Veterinary Medicine and seven Department Chairmen. It is further recommended that the Departments of Veterinary Science (Division of Microbiology and Veterinary Medicine at the University of Wyoming) at each of the participating universities serve as departments in the Regional CVM.

This study recommends that the veterinary faculty at each of the five participating universities be represented on the Standards Committee and the Curriculum Committee of the Regional college. Finally, it is recommended that an Admissions Committee in each of the five states be responsible for (a) evaluation of applicants from its respective state and (b) certifying to the Chairman of the Department of Veterinary Science, who shall certify to the Dean of College of Veterinary Medicine, those students who are selected to fill the state's quota in the first year class.

CHAPTER 7

FEDERAL, FOUNDATION AND PRIVATE SOURCES OF CAPITAL AND OPERATING FUNDS

Nineteen colleges of veterinary medicine are currently attempting to serve fifty states in the nation and as such these colleges are considered a national resource. During the past decade a large proportion of the funds for capital as well as for operation was provided by federal agencies. Federal and other nonstate sources of funds for veterinary colleges were investigated and are summarized below.

FEDERAL SUPPORT OF COLLEGES OF VETERINARY MEDICINE

A level of appropriations and availability of federal funds are uncertain from year to year; however, this section will include those federal statutes authorizing the support of programs in colleges of veterinary medicine as of the date of this writing, November 3, 1975.

Comprehensive Health Manpower Training Act (P.L. 92-157) as Amended (1)

The Veterinary Medical Education Act (Public Law 89-709) amended the Health Manpower Education Act to authorize funds for veterinary colleges for construction, operation, scholarships, and loans. In 1975 Congress passed a continuing resolution authorizing continuation of the above program until final action is taken on substantive legislation and appropriations.

Construction. The maximum federal share of costs of construction for new colleges or major expansion of existing colleges was set at 80 percent. In 1974 veterinary colleges received awards of funds totaling $15,218,840 for construction of teaching and research facilities. In 1975 construction grants totaled $10.8 million. A construction program covers aquisition of existing buildings (but not including the land on which these buildings stand) and the cost of interim facilities to provide space on a short-term ("less than 10 years") basis while facilities of a more permanent nature are being planned or constructed. Evaluation of proposals is made under competitive circumstances; construction projects may be funded at less than maximum support provided by law. This is particularly the case since appropriations are uncertain from year to year and provide an unreliable basis for long-term planning. Inter-institutional construction, like colleges of medicine and veterinary medicine or a regional college, has been looked upon very favorably.

For purposes of receiving construction assistance under the above federal legislation, a new college of veterinary medicine must be planned, programmed, and have a funding commitment to fulfill all requirements for accreditation. A new school is responsible for initiating a request for reasonable assurance of accreditation from the responsible accrediting body, the American Veterinary Medical Association. Before being provided with this statement of reasonable assurance of accreditation and prior to its first application for construction or other funds from the federal government, a developing college of veterinary medicine should request an evaluation by the AVMA Council on Education. The Council will then designate two or more members to conduct an on-site study of the developing college. The Council will evaluate the site visit report and determine whether or not there is indication of reasonable assurance that the new college will be able to meet the requirements of the "Essentials of an Acceptable Veterinary Medical School" by the time it has been in operation for two years. The AVMA provisional accreditation report is sent to the Commissioner of Education, U.S. Office of Education, with a request for a "Certificate of Reasonable Assurance" (2,4).

Operational Funds. The Secretary of Health, Education, and Welfare is authorized to make annual awards known as capitation grants (support based upon the number of students enrolled in the DVM program) to colleges of veterinary medicine for the support of the education programs. To be eligible for a capitation grant, the applicant must be accredited by the Council on Education of the American Veterinary Medical Association or have received a finding of reasonable assurance of accreditation from the U.S. Commissioner of Education. A new school may apply for a grant in the fiscal year preceding the fiscal year in which it will admit its first class by providing reasonable assurance that it will admit its first class by the following October 15. The amount of the annual grant to each such school with an approved application is computed for each fiscal year as follows: each college of veterinary medicine shall receive not more than $1,750 for each full-time student, and $700 for each enrollment bonus student. A bonus student is defined as any student in a first-year class that has or had an enrollment exceeding that of the preceding year by five percent or five students, whichever is greater. Capitation funds in the amount of $8,880,716 were allocated to veterinary colleges in fiscal year 1974 and $7,011,770 in fiscal year 1975 (3,4).

Health Professions Scholarship Program. This program assists students having exceptional need for financial assistance. Each college participating in this program is responsible for selecting the recipients of scholarships and determining the amount of assistance a student may receive. The maximum scholarship a student may receive for a calendar year is $3,500 or the amount of his financial need, whichever is the lesser (5).

For the fiscal year 1974 and 1975 the grant formula for scholarship funds awarded to colleges is the greater of (1) $3,000 x number of full-time students from low-income backgrounds, or (2) $3,000 x 1/10 the number of full-time students of the school. Scholarship funds in the amount of $735,774 were awarded to veterinary colleges in fiscal 1974 and $293,763 in fiscal year 1975 (4).

Student Loans. The student loan program provides long-term, low-interest loans to support students having need for financial assistance. Colleges of veterinary medicine received $1,864,426 of loan funds in fiscal year 1974 and $1,879,563 in fiscal year 1975 (4,6).

The maximum amount a veterinary student may borrow for an academic year is $3,500, or the amount of his financial need, whichever is the lesser. The interest rate is 3 percent.

Each school participating in this program is responsible for selecting the recipients of loans and for determining the amount of assistance a student requires. Loans are payable to the school over a ten-year period which begins one year after completion of studies. The law provides that if the student agrees to practice veterinary medicine for at least two years in an area of a state which has been determined to have a shortage of and need for veterinarians, the federal government will repay a portion of the outstanding principal and interest as follows:

1. Upon completion of your first year of the practice as specified in the agreement, 30 percent of the principal and interest of each such loan which is outstanding on the date you begin such practice will be repaid.
2. Upon completion of your second year of such practice, another 30 percent of the principal and interest of each such loan will be repaid.
3. Upon completion of a third year of such practice, an additional 25 percent of the principal and interest of each such loan will be repaid (6).

The Secretary of HEW, after consultation with the appropriate state health authority and the Health Scarcity Area Identification Program, has designated areas in the following Old West states as shortage areas:* Montana, Nebraska, North Dakota and South Dakota (7).

Special Project Grants. The Comprehensive Health Manpower Training Act provides for grants to assist colleges of veterinary medicine in meeting the costs of special projects. Such a grant may be awarded to accomplish among others one of the following purposes:

a. to develop programs for cooperative interdisciplinary training among schools of medicine, dentistry, veterinary medicine, nursing, public health, allied health, and other health professions schools, including instruction in the use of the team approach to the delivery of health services;

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* Listed by county

b. to develop and operate training programs and train for new roles, types, or levels of health personnel, including programs for the training of assistants to health professionals;

c. to research, develop, or demonstrate advances in the various fields related to education in the health professions;

d. to assist in increasing the supply, or improving the distribution, by geographic area or specialty groups, of veterinarians;

e. to establish and operate projects designed to increase enrollment in colleges of veterinary medicine;

f. to establish and operate projects designed to increase enrollments from minority or low-income groups; and

g. to plan experimental teaching programs and facilities (8).

Health Manpower Initiative Grants. Grants are available for projects to establish training programs for veterinary students in shortage areas to improve the supply, quality, utilization and geographic and specialty distribution of veterinarians and other health professionals. These grants also support projects to educate students in auxiliary health fields in the use of the interdisciplinary team approach to the delivery of primary health care (9).

Summary of Amount of Awards from Health Resources Administration. Federal sources provide a large part of veterinary college funds. In the development of the financial plan for the regional CVM, it is imperative to have specific information on each federal program and the amount of the awards made to U.S. veterinary colleges in the last two fiscal years. Table 7.1 summarizes the funds awarded to the U.S. veterinary colleges by the Health Resources Administration. Awards for the five programs totaled

TABLE 7.1 Federal Funds Received by U.S. Veterinary Colleges in Fiscal Years 1974 and 1975 Primarily for Veterinary Medical Education

Name of Program	Amount of Award in Fiscal Year	
	1974	1975
Construction of Facilities	$15,218,840	$10,800,000
Capitation	8,880,716	7,011,770
Scholarships	735,774	293,763
Loans for DVM Students	1,864,426	1,879,563
Special Projects	828,225	316,427
Total	$27,527,981	$20,301,523

Source: U.S. Department of Health, Education, and Welfare, Health Resources Administration, Bureau of Health Resources Development, Bethesda, Maryland. Personal Communication, November 3, 1975.

$27,527,981 in fiscal year 1974, and $20,301,523 in fiscal 1975. Among the programs supported, the largest sum, over $15.2 million in 1974 and $10.8 million, was granted for construction of veterinary college facilities (4).

Animal Resources for Medical Research

The National Institutes of Health awards project grants for the improvement of animal resources for medical research. Specific types of projects that may be supported include: developing and defining new animal biological models, developing and improving institutional animal resources, developing and maintaining diagnostic laboratories, improving the health and well-being of research animals, and gathering and disseminating information on research animals.

Colleges of veterinary medicine conducting programs in biomedical research may apply for an animal resources grant. The proposed grant must serve qualified biomedical investigators on a regional or national basis. Grant applications are reviewed according to need for the project and quality of research facilities and personnel (10).

Animal Health Research Act

The U.S. Senate and House of Representatives passed and sent to the President for approval, H.R. 11873, to authorize the Secretary of Agriculture to encourage and assist the states in carrying out a program of animal health research (11). Among those institutions eligible for money appropriated under this proposed act are all accredited colleges of veterinary medicine. Although the President vetoed the bill in August 1974, its provisions are summarized here because Congress expects to renew its efforts to present a compromise Animal Health Research Act which the President will approve.

Under the provisions of this bill, Congress would be authorized to appropriate up to $75 million for the following purposes:

a. to support continuing research programs by meeting the expenses of conducting research, publishing and disseminating research results, administrative direction, purchase of equipment and supplies, and alteration or renovation of buildings;

b. twenty million dollars to support research on specific national or regional animal health problems (including fresh-water fish and shellfish); and

c. twelve million dollars to support the costs of providing veterinary medical research facilities, which costs may include the purchase of land, construction or remodeling of buildings, and buying and installing research equipment (12).

Hatch Act

The Hatch Act of 1887 and other laws stemming from this act provide federal funds for agricultural research in the agricultural experiment stations established at land grant universities (13). A part of agricultural research includes veterinary research. As a part of five universities, the regional college is eligible and should receive Hatch Act funds through the Agricultural Experiment Stations of each of the universities.

Other Federal Support

Colleges of veterinary medicine are eligible to apply to federal agencies and compete for grants and contracts to support research and research training, libraries, biomedical communication, and international veterinary medicine. The National Institutes of Health (Public Service Act of 1944) is the source of the largest amount of grant funds available to colleges of veterinary medicine.

OTHER GOVERNMENT SUPPORT

The Old West Regional Commission is presently authorized to provide capital funds for demonstration projects. Each application for funds is evaluated on its merit in competition with other proposals throughout the Region. In addition, the Commission is preparing a regional economic plan which after approval will result in new authority to supplement federal grant-in-aid programs.

FOUNDATIONS AND PRIVATE SOURCES

Foundations

State-supported universities strive to build endowments and acquire funds for special projects from foundations and private donors as well as from federal agencies. The Annual Register of Grant Support 1974-75 (14) and The Foundation Directory and Supplement Number One to July 1975 provides the academic and professional community a comprehensive up-to-date list of existing forms of financial aid. The number of foundations by program area for which veterinary colleges qualify for support are as follows: 14 for medical education and training, 62 for cancer education and research, 18 for continuing education, 59 in environmental health, 119 in medical research, and 232 in medical sciences. Only 7 (2 private and 5 federal) are listed specifically for veterinary medicine.

It is noteworthy that there are 18 foundations with headquarters in the Old West Region (MT, 1; NE, 12 ; SD, 1; and WY, 4). Eleven of the 18 support higher education, health, or student loans. For example, two foundations in Wyoming grant loans to students from Sheridan, or from five Northeastern counties in the State.

A search of foundation directories revealed no foundation or other nongovernmental sources of funds for construction of facilities specifically for veterinary colleges (14,15). In consideration of the available information, it is clear that veterinary colleges may compete with other biomedical institutions for operating funds for specific projects (fellowships, scholarships, research). It is not feasible for the proposed college to develop a stable and reliable financial base upon gifts and grants from foundations and private donors. It is, however, recommended that the new college be aggressive and skillful in the development of proposals and in seeking financial support of its programs from foundations, industry, and private donors as well as from federal agencies.

Income from Professional Services

Veterinary colleges generate a certain amount of operating income from professional activities in the teaching hospital, clinical laboratory, and field service. The income so generated at the proposed college will be minimal in the first year of operation but will increase over time.

Tuition

In general, the annual cost of education for veterinary students is similar to that for medical students (13,16), which implies that tuition levels should also be similar to that for medical students.

RECOMMENDATIONS

A large portion of the capital and operating funds, as well as student scholarships and loans, for the nation's veterinary colleges is provided by federal agencies.

It is essential that college administrators seek federal participation in construction with utmost vigor and expertise. If the college is successful in obtaining federal funds for construction, this study RECOMMENDS that such funds obtained be used as a credit proportional to the amount of participation by each state.

It is feasible for the college to plan for grants, contracts and gifts to support education, research, scholarships and fellowships. This study RECOMMENDS that the leadership of the veterinary college be aggressive and skillful in seeking financial support of its programs from foundations, industry, and private donors, as well as from federal agencies.

This study RECOMMENDS that the level of tuition for DVM students be identical to that for medical students at the University of Nebraska College of Medicine.

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CHAPTER 8

CAPITAL COSTS

Two of the basic assumptions presented in Chapter One are especially germane to the costs of the proposed college: (a) an innovative curriculum shall be designed to maximize the use of existing veterinary science departments and industrial, government and private resources in the five states, and (b) consistent with a high quality, fully accredited college, the capital costs shall be as reasonable as possible.

In the development of requirements for the Northern Plains CVM, space allocated to each function is neither optimal nor minimal. Less space would compromise quality and endanger accreditation; a more elaborate program would provide useful but not mandatory space for a successful CVM. Each of the five departments of veterinary science, or equivalent, have facilities for preveterinary medical education, graduate education, diagnostic service and research. It is the objective of this chapter to determine the cost of additions to existing facilities which will enable the five veterinary science departments to add the Doctor of Veterinary Medicine degree program.

Research on this topic logically followed four pathways:

1. Development of an inventory of facilities at each of the five universities which may be shared and serve as part of the regional CVM;

2. Determination of the total space requirements for the proposed college;

3. Calculation of the number of square feet and cost of new construction to be added to the existing facilities; and

4. Development of an equitable financial plan.

EXISTING FACILITIES AND LAND WHICH MAY BE SHARED AND SERVE AS PART OF REGIONAL COLLEGE

Data on the number of acres of land and square feet of facilities at each participating university, which might be shared with the regional CVM, was obtained by questionnaire (Appendix A). In addition, Dr. B.W. Kingrey and Dr. C.R. Cole visited each university for on-site inspection and evaluation of the appropriateness of those facilities for veterinary medicine. A summary of the facilities was prepared to show the identification of the building or space, number of gross square feet (GSF) to be shared, 1975 replacement cost per gross square foot, and total replacement cost in 1975. The estimated replacement value of the land at the campus site and the land reserved for veterinary research was also reported. The above summary was then mailed to each veterinary science department for verification of the data.

Basis for Estimating Replacement Costs

Replacement cost for 1975 was based upon (a) actual construction bids on the facility, or similiar campus buildings, obtained by the university in 1975 or escalated to 1975; (b) actual 1975 bids on comparable facilities at universities in the Old West states and/or outside of the Region; (c) estimates on cost of land and facilities by appropriate officials of the university; (d) consulting architects; and (e) Building Construction Cost Data 1975, Robert Snow Means Company (1). Estimates of total project costs include: total building work; fees such as architectural, engineering, supervision, inspection, legal, tests and borings; fixed and movable equipment; contingencies; site improvements; and on-site and off-site connecting utility lines. The cost of streets was not included.

Only space directly related to programs of the CVM were included in the inventory. Not included are dormitories, prorated share of student centers, cafeterias, recreational areas, administrative areas, computer centers, cultural facilities, and similar use facilities.

Inventory

Tables 8.1 through 8.5 present the data on existing facilities including land at each university which may be shared and serve as part of the regional CVM.

Montana State University, according to the inventory presented in Table 8.1, has 42,850 gross square feet of space valued at nearly $3 million which may be shared and serve as part of the regional college. Although the University has need for new facilities in several areas, through close scheduling of existing teaching areas it will be possible to accommodate Montana veterinary students in the first year and during one quarter of the fourth year of the DVM program.

It is feasible to teach 20 medical and 17 veterinary medical students simultaneously in several of the preclinical sciences. Autotutorial laboratory, classroom, and laboratory requirements for medical and veterinary medical students are identical. Since approximately 75 percent of the library accessions are the same for medical and veterinary medical students, it is appropriate to share the library resources. In fact, the remodeled space for medicine in the University Library is listed in the inventory as shared space.

Land on campus and at the veterinary research farm is available.

TABLE 8.1 Inventory of Facilities and Land at Montana State University which May Serve as Part of the Regional College of Veterinary Medicine

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975[(a)]	Replacement Cost in 1975
Vet. Research and Diagnostic Laboratory	25,000	$70.00[(b)]	$1,750,000
Vet. Research Buildings at Huidekoper Station	5,500	53.00[(b)]	291,500
Clinical Medicine	1,350	53.00[(b)]	71,550
Library	5,500	48.35(c)	265,925
Classroom	900	55.75[(c)]	50,175
Laboratories[(d)]	1,600	65.19[(e)]	104,304
Autotutorial[(f)]	2,400	60.00[(e)]	144,000
Seminar	600	43.15[(e)]	25,890
Off-Site Utilities for 11,000 GSF		5.00[(e)]	55,000
Boiler and Equipment for 11,000 GSF		.50[(e)]	5,500
Library Monographs and Serials(g)			150,000
Subtotal Facilities[(h)]	42,850		$2,913,844

TABLE 8.1 (cont'd)

LAND

Land Site	Acres	Replacement Cost/Acre 1975 (e)	Replacement Cost in 1975
Campus	40	15,000	600,000
Vet. Research	460	1,500	690,000
Subtotal Land	500		$ 1,290,000
Total Replacement Cost of Land and Facilities in 1975			$4,203,844

(a) Estimates include: fees such as architectural, engineering, supervision, inspection, legal, tests and borings; total building work; contingency, fixed and movable equipment; site improvements; and on-site utility connecting lines. Not included are costs of land and streets. Arithmetic differences are attributed to rounding.

(b) Montana State University experience in 1975 dollars or Vet. Science construction at other universities in 1975.

(c) Source: Building Construction Cost Data 1975, Robert Snow Means Company, Duxbury, Massachusetts.

(d) Laboratory (high and low bench space), circulation and supplies.

(e) Comparable facility at other universities.

(f) Carrels, circulation, storage and instructor module.

(g) Comparable collection at The Ohio State University.

(h) Excludes dormitory, recreational and limited use facilities.

The University of Nebraska-Lincoln, according to the inventory presented in Table 8.2, can share facilities and land which has a 1975 replacement cost of over $11 million. Forty acres of land for the campus site, and 300 acres off-campus for the veterinary medical research farm have been reserved for the CVM.

The following buildings are under construction and when completed may be shared and serve as part of the veterinary college; Veterinary Basic Science, Animal Diagnostic Laboratory, Animal Health Research, and the Animal Holding Building. Completion of the above buildings, comprising the Animal Health Center, is scheduled for the period November 1975 to December 1976. An off-site tunnel with utility lines to the Animal Health Center will serve additional construction required by the CVM. The boiler and cooling equipment is also of sufficient capacity to serve the additional veterinary college facilities.

The Thompson Library and its medical and veterinary medical holdings and computer-based services will serve the veterinary students and faculty (replacement value $952,300).

Although heavy demands are currently made on the classrooms and laboratories on the UN-L Campus, through close scheduling it is feasible to share 3,400 GSF of such space, in addition to the Animal Health Center, with veterinary medical students.

TABLE 8.2 Inventory of Facilities and Land at the University of Nebraska which May be Shared and Serve as Part of the Regional College of Veterinary Medicine

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975(a,b)	Replacement Cost in 1975	Remarks
Vet. Basic Science	36,700	$65.19	$2,392,473	Bid Aug. 19, 1975 Completion Dec., 1976
Animal Diagnostic Laboratory	18,080	60.00	1,084,800	Bid Aug. 24, 1974 Completion Nov., 1975
Animal Health Research	47,029	81.28	3,822,517	Bid May 1, 1975 Completion Nov., 1976
Animal Holding	3,308	53.00	175,324	Bid May 1, 1975 Completion Nov. 4, 1975
Library	11,000	59.30	652,300	Bid Oct., 1972; cost escalated to 1975 dollars; Completed in Dec., 1974
Gnotobiotic Animal	2,048	53.00	108,544	Estimated by UN-L
Off-Site Utilities for above 118,165 GSF		5.00	590,825	Electric, steam, chilled water, gas, water and sewer in tunnel

TABLE 8.2 (cont'd)

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975[a,b]	Replacement Cost in 1975	Remarks
Classroom	1,800	55.75	100,350	See (c)
Laboratories	1,600	65.19	104,304	
Boiler and Cooling Equipment for above 121,565 GSF		1.25	151,956	See (b)
Vet. Sci. Animal Housing at Wahoo Field Lab.	11,428	36.70	419,407	Estimated by UN-L
Library Monographs and Serials			300,000	See (d)
Subtotal Facilities[e]	132,993		$ 9,902,800	

LAND

Land Site	Acres	Replacement Cost/Acre 1975	Replacement Cost in 1975	Remarks
Campus	40	25,000	1,000,000	Estimated by UN-L
Vet. Research	300	1,500	450,000	Estimated by UN-L
Subtotal Land	340		$ 1,450,000	
Total Replacement Cost of Facilities and Land in 1975			$11,352,800	

TABLE 8.2 (cont'd)

[a] Estimated cost include: fees such as architectural, engineering, supervision, inspection, legal, tests and borings; total building work; fixed and movable equipment; site improvements; on-site utility connecting lines, and contingency. Not included are costs of land and streets. Arithmetic differences are attributed to rounding.

[b] University of Nebraska experience in construction of Veterinary Science and other facilities in 1975.

[c] Building Construction Cost Data 1975, Robert Snow Means Company, Duxbury, Massachusetts.

[d] Comparable collection at The Ohio State University.

[e] Excludes dormitory, recreational and limited use facilities.

North Dakota State University, according to the inventory presented in Table 8.3, can share facilities and land which has a 1975 replacement cost of over $4.5 million. Thirty-five acres of land on campus and 150 acres off campus are available for the CVM.

When completed the following new buildings, under construction or funded and soon to be constructed, can be shared and serve as part of the veterinary college: Veterinary Science-Bacteriology, Animal Isolation, Animal Holding, and Animal Health. The library, classroom, laboratory, autotutorial, and seminar space outside of the above new buildings can through close scheduling be shared with North Dakota's veterinary students. A total of 80,285 GSF of new and existing facilities valued at nearly $4 million can feasibly be shared with veterinary students and faculty.

TABLE 8.3 Inventory of Facilities and Land at North Dakota State University which May be Shared and Serve as Part of the Regional College of Veterinary Medicine

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975 (a)	Replacement Cost in 1975
Vet. Science - Bacteriology	41,271	\$50.79 (b)	\$2,096,154
Buildings A, B, C			
Animal Isolation	6,150		
Animal Holding	3,564		
Animal Health	4,293		
Total for A, B, C	14,007	40.81 (c)	571,607
Library	5,500	48.35 (d)	265.925
Classroom	900	55.75 (d)	50,175
Laboratories	1,600	65.19 (e)	104,304
Autotutorial	2,400	60.00 (e)	144,000
Seminar	600	43.15 (e)	25,890
Off-Site Utilities for 80,285 GSF		5.00 (e)	401,425
Boiler & Equipment for 80,285 GSF		.50 (e)	40,143
Library Monographs and Serials		(f)	75,000
Subtotal Facilities	80,285	(g)	\$ 3,774,623

TABLE 8.3 (cont'd)

LAND

Land Site	Acres	Replacement Cost/Acre 1975	Replacement Cost in 1975
Campus	35	15,000	525,000
Vet. Research	150	1,500	225,000
Subtotal Land	185		$ 750,000
Total Replacement Cost of Land and Facilities in 1975			$4,524,623

(a) Estimates include: fees such as architectural, engineering, supervision, inspection, legal, tests and borings; total building work; contingency, fixed and movable equipment; site improvements; and on-site utility connecting lines. Not included are costs of land and streets. Arithmetic differences are attributed to rounding.

(b) Bid Jan. 22, 1974 at $42.04/GSF and escalated 1.0%/month to August 22, 1975.

(c) North Dakota State University bid September 30, 1975; to be rebid.

(d) Building Construction Cost Data 1975, Robert Snow Means Company, Duxbury, Massachusetts.

(e) Comparable facility at other universities.

(f) Comparable collection at Ohio State University.

(g) Excludes dormitory, recreational and limited use facilities.

South Dakota State University, according to the inventory presented in Table 8.4, can share facilities and land which has a 1975 replacement cost of over $3.6 million. Forty-five acres of land on campus are available for the CVM. Buildings for the Department of Veterinary Science were constructed or remodeled between 1969 and 1973. Additional space is needed by the Department but there is no need for the CVM to duplicate existing facilities. The Animal Science Building, Livestock Arena, Meat Laboratory, and the University Library were bid in 1975 and are under construction. In addition, the Home Economics and Nursing Building has auto-tutorial laboratories and classrooms of advanced design which may through close scheduling be shared with South Dakota's veterinary students. The College of Pharmacy has (a) a library to be vacated when the new University Library opens, which will provide space for a suite of offices for veterinary faculty, and (b) a laboratory with 32 stations which through careful scheduling can accommodate veterinary students. A total of 64,808 GSF of new and existing facilities valued at over $3.4 million can feasibly be shared with South Dakota's veterinary students and faculty.

TABLE 8.4 Inventory of Facilities and Land at South Dakota State University which May be Shared and Serve as Part of the Regional College of Veterinary Medicine

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975[(a)]	Replacement Cost in 1975	Remarks
Animal Disease Research and Diagnostic Lab.	18,591	\$70.00[(b)]	\$1,301,370	
Cattle Disease Research	3,326	20.64[(c)]	68,648	
Veterinary Isolation	5,120	53.00[(b)]	271,360	Bid 1969 and cost escalated to 1975
Cattle Shed	4,605	11.87[(c)]	54,641	Remodeled in 1973
Library	5,500	31.87[(c)]	175,285	Bid May 1975
Animal Science Classroom, Seminar & Laboratories	3,300	66.07[(c)]	218,031	Bid May 1975
Livestock Arena	18,350	23.49[(c)]	431,041	Bid May 1975
Autotutorial	2,856	34.00[(c)]	97,104	Home Economics & Nursing
Pharmacy Lab.	1,600	66.07[(c)]	105,712	32 Stations
Pharmacy Library	1,560	38.45[(d)]	59,982	26' x 60' in Shepard Hall
Off-Site Utilities for 60,203 GSF		5.00[(e)]	301,015	

TABLE 8.4 (cont'd)

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975 (a)	Replacement Cost in 1975	Remarks
Boiler and Equipment for 60,203 GSF		.50 (e)	30,102	
Library Monographs and Serials		(g)	300,000	
Subtotal Facilities (f)	64,808		$3,414,291	

LAND

Land Site	Acres	Replacement Cost/Acre 1975 (c)	Replacement Cost in 1975	Remarks
Campus	45	5,000	225,000	
Vet. Research	0			
	45		$225,000	
Total Replacement Cost of Facilities and Land			$3,639,291	

(a) Estimates include: fees such as architectural, engineering, supervision, inspection, legal, tests and borings; total building work; contingency, fixed and movable equipment; site improvements; and on-site utility connecting lines. Not included are costs of land and streets. Arithmetic differences are attributed to rounding.

(b) Veterinary Science construction bid at other universities in 1975.

(c) South Dakota State University bid cost escalated to September 1975.

TABLE 8.4 (cont'd)

(d) Building Construction Cost Data 1975, Robert Snow Means Company, Duxbury, Massachusetts.

(e) Comparable facility at other universities.

(f) Excludes dormitory, recreational, and limited use facilities.

(g) Comparable collection at Ohio State University.

The University of Wyoming, according to the inventory presented in Table 8.5, can share facilities and land which has a 1975 replacement cost of over $1.7 million. Fifty acres of land on campus and 150 acres off campus have been reserved for the CVM. Although the Division of Microbiology and Veterinary Medicine has need for additional facilities there is no need for the CVM to duplicate existing facilities. Existing facilities (10,064 GSF) valued at nearly $760,000 can feasibly be shared with Wyoming's veterinary students and faculty.

The University is currently studying the feasibility of establishing a college of medicine on its campus. Medical students and veterinary students logically may concurrently utilize the same facilities and courses of instruction during the early phase of their respective curricula.

TABLE 8.5 Inventory of Facilities and Land at the University of Wyoming which May be Shared and Serve as Part of the Regional College of Veterinary Medicine

FACILITIES

Name of Facility	Gross Square Feet	Replacement Cost/GSF 1975[a]	Replacement Cost in 1975
Isolation Laboratory	3,000	\$81.28[b]	\$243,840
Div. of Microbiology and Vet. Med.	7,064	65.19[b]	460,502
Off-Site Utilities for 10,064 GSF		5.00[c]	50,320
Boiler and Equipment for 10,064 GSF		.50[c]	5,032
Subtotal Facilities[d]	10,064		\$759,694

LAND

Land Site	Acres	Replacement Cost/Acre 1975	Replacement Cost in 1975
Campus	50	15,000	750,000
Vet. Research	150	1,500	225,000
Subtotal Land	200		\$975,000
Total Replacement Cost of Facilities and Land			\$1,734,694

TABLE 8.5 (cont'd)

[a] Estimates include: fees such as architectural, engineering, supervision, inspection, legal, tests and borings; total building work; contingency, fixed and movable equipment; site improvements; and on-site utility connecting lines. Not included are costs of land and streets. Arithmetic differences are attributed to rounding.

[b] Vet. Science construction bid at other universities in 1975.

[c] Comparable facility at other universities.

[d] Excludes dormitory, recreational and limited use facilities.

Summary of Existing Facilities

Table 8.6, indicates that 331,000 GSF may be shared by the participating universities and serve as part of the regional CVM. Replacement costs of the facilities in 1975 total $20,765,252; replacement cost of the land totals $4,690,000. On the whole the amount of existing space which may be shared is large. No facility exists for clinical instruction or patient care. In many instances the existing space is either not totally usable or is not available except at irregularly scheduled times from semester to semester. For example, the first year class of 17 at MSU, 37 at UN-L, 14 at NDSU, 17 at SDSU and 11 at UW may be scheduled in classrooms and laboratories with two or three times as many stations as students.

Generally the universities have minimal office and laboratory space for the faculty and staff. Approximately 4.4 FTE veterinary faculty plus nonacademic staff will be needed to supplement the existing personnel for instruction of veterinary students at MSU, NDSU, SDSU and UW. When the Pharmacy Library moves from Shepard Hall, SDSU university will have approximately 1,560 net assignable square feet (NASF) for partitioning into storage for learning resources and offices for veterinary faculty and staff. MSU, NDSU and UW did not designate specific office and laboratory areas for veterinary faculty and staff. University officials propose to provide space for veterinary faculty and staff at MSU, NDSU and UW by reassigning existing space, or remodeling existing space, or possibly construction of a minimal amount of new space.

TABLE 8.6 Summary of Facilities and Land Which Each Participating University May Share With the Regional College of Veterinary Medicine (a)

University	Facilities GSF	Replacement Cost in 1975 (b) Facilities	Land	Replacement Cost of Facilities and Land - 1975
MSU	42,850	$2,913,844	$1,290,000	$4,203,844
UN-L	132,993	9,902,800	1,450,000	11,352,800
NDSU	80,285	3,774,623	750,000	4,524,623
SDSU	64,808	3,414,291	225,000	3,639,291
UW	10,064	759,694	975,000	1,734,694
TOTAL	331,000	$20,765,252	$4,690,000	$25,455,252

(a) Exclusive of dormitory, and pro-rated recreational, university administration, and computer facilities.

(b) Basis for estimates include: Actual bids in 1975 for construction of total project on each respective campus; actual 1975 bids on comparable facilities in Old West states or university outside of the Region; estimates by officials at each university; architect and engineering consultants and; Building Construction Cost Data 1975, 33rd Annual Edition, Robert Snow Means Company. Excludes cost of streets.

TOTAL SPACE REQUIREMENTS FOR REGIONAL COLLEGE

Method for Calculation

Institutional data presented in Chapter Three gave a profile of the enrollment, faculty, and nonacademic personnel. Bareither and Schillinger published space planning factors including those for veterinary medicine (2). Table 8.7 presents the calculation of space requirements based upon the institutional data and modified Bareither-Schillinger standards.

Results of Calculations

Application of space-planning factors to each space classification yielded a total of 245,995 net assignable square feet (NASF). It is also essential to determine the gross square feet required. Animal patient wards represent over 90 percent net assignable area; sophisticated laboratory areas in a building represent between 50 and 60 percent net assignable space. When the entire facility is considered, 65 percent of the space is assignable to the occupant and 35 percent of the space is allocated to circulation (corridors, stairways, lobbies, walls, lavatories, and mechanical and custodial service areas. If 65 percent of the facility is NASF, then 378,454 is total gross square feet (245,995 ÷ 0.65 = 378,454). This conversion from NASF to gross square feet is essential because construction costs are customarily expressed in dollars per GSF.

TABLE 8.7 Space Requirements for Regional College

Space Classification and Institutional Data	Net Assignable Square Feet
Office and Conference Space	
(135 sq. ft. x 200 faculty, administrators, and nonacademic staff requiring offices)	27,000
Instructional Space	
Autotutorial (including production of learning resources, storage, carrels, and group study) (34 sq. ft. x 384 FTE)	13,056
Multifunctional Laboratories (4.25 sq. ft. x 2,000 weekly student hours)	8,500
Animal quarters (16 sq. ft. x 384 students)	6,144
Seminar and Classroom (0.932 sq. ft. x 3,400 weekly student hours)	3,168
Investigational Space	
Laboratories (275 sq. ft. x 95 FTE graduate students and faculty)	26,125
Animal quarters (500 sq. ft. x 95 FTE graduate students and faculty)	47,500
Storage	
(20% of instructional and investigational space)	20,900
Commons	
(2.5 sq. ft. x 449 DVM and graduate students)	1,123

TABLE 8.7 Space Requirements for Regional College (cont'd)

Space Classification and Institutional Data		Net Assignable Square Feet
Locker and Cleanup		
Students (10 sq. ft. x 449 DVM and graduate students		4,490
Staff (10 sq. ft. x 133 staff requiring lockers)		1,330
Clinical Space		
(782 sq. ft. x 96 third year students)		75,072
Library		
Stack space (0.18 sq. ft. x 40,000 volumes)	7,200	
Reader space		
DVM students (7.5 sq. ft. x 384)	2,880	
Graduate students (7.5 sq. ft. x 65)	488	
Faculty (3.0 sq. ft. x 96)	288	
Service space 20% of reader space	731	
Total Library Space		11,587
Total Net Assignable Square Feet (NASF)		245,995
Total Gross Square Feet (GSF) (245,995 ÷ 0.65)		378,454

CAPITAL COST OF ADDITION TO EXISTING FACILITIES

Comparison of the total space required for the CVM with the inventory of existing space reveals unmet needs for (a) clinical teaching and patient care facilities, (b) specialized student learning areas, and (c) faculty offices and laboratories. These unmet requirements represent new construction which is essential. It is the purpose of this section to determine the capital cost of the total addition to existing facilities. This analysis requires two distinct steps: determination of a construction cost factor applicable to veterinary medical buildings and determination of the number of GSF of new construction to be added.

Determination of Cost per Gross Square Foot

Architects rely upon a multitude of factors in the preparation of cost estimates. Examples are:

1. Current construction contracts on comparable facilities in the same geographical area awarded after competitive bidding.
2. Recent construction bids on comparable facilities outside of the geographical area.
3. Use of 1975 construction cost indexes. For example, the Robert S. Means Building Construction Cost Data 1975 contains voluminous computer-based data (over 7,500 construction projects in the United States and Canada) analyzed as to total and component cost and percentages. Cost index

> figures are presented for over 200 cities, and separate index figures are listed for material, labor and total costs (1).

The most reliable cost estimate is based on recent competitive construction bids on comparable veterinary medical facilities located geographically in or near the area of the proposed construction. Investigation of new and planned veterinary medical facilities identified seven projects (Table 8.8) which were or will be bid between January 1974 and August 1976. Three of the projects are located at universities (UN-L and NDSU) in the Old West Region; three projects are located at colleges of veterinary medicine in states (Kansas and Colorado) contiguous with Nebraska; and one project, is located at Minnesota's College of Veterinary Medicine in a state contiguous with the Region.

The teaching, diagnostic and research facility at North Dakota State University cost $50.79 per GSF when completed in October 1975. At the University of Nebraska-Lincoln the Basic Science facility was bid at $65.19/GSF, and the Diagnostic Laboratory at $60.00/GSF, on August 19, 1975. All of the projects summarized in Table 8.8 yield valuable comparative cost data; however, only Kansas State's facility and Colorado State's Teaching Hospital are planned primarily for clinical instruction.

Colorado State University plans to construct a Veterinary Teaching Hospital estimated to cost $56.84 per GSF when bid in 1976. The Colorado facility is designed with a low-cost animal area which is larger than that required in the proposed addition for the Northern Plains CVM (3).

Fortuitously, construction of a facility at Kansas State University is very comparable to the proposed addition for the regional college. Kansas State's Clinical Sciences and Pathology facility was bid on August 21, 1975 and placed under contract for completion in September 1978 (4,5). Equally fortunate, is the fact that the above is located in Manhattan, Kansas, where construction costs compare favorably with those at Lincoln, Nebraska. Comparison of the Kansas State University project with the proposed construction at UN-L revealed one minor difference. Inclusion of $120,000 for two water chillers and $50,000 for other cooling equipment in the Kansas State University project is not required at UN-L because the central cooling capacity at UN-L is more than adequate for the proposed addition. After adjustment for the above equipment, Kansas State's Clinical Sciences and Pathology project of 268,000 GSF was bid at $16,834,487 on August 21, 1975, or $62.81 per GSF. For the purpose of this study, this figure is rounded to $63.00 per GSF.

TABLE 8.8 Current Gross Square Foot Cost of Construction of Veterinary Medical Buildings in the Old West Region and in States Contiguous with the Region

University	Veterinary Medical Facility	Total Project Cost per Gross Square Foot*	Date of Bid or Estimate, and Completion
University of Nebraska-Lincoln	Basic Science	$ 65.19	Bid Aug. 19, 1975 Completion Dec. 1976
University of Nebraska-Lincoln	Diagnostic Laboratory	60.00	Bid Aug. 24, 1974 Completed Nov. 1975
North Dakota State University	Teaching, Diagnostic, Research	50.79	Bid Jan. 1974 Completed Oct. 1975
Colorado State University	Pathology	65.33	Bid Nov. 1974 Completion Dec. 1976
Colorado State University	Teaching Hospital	56.84	To be Bid Early 1976 Completion 1378
Kansas State University	Clinical Sciences and Pathology	62.81**	Bid Aug. 21, 1975 Completion Sept. 1978
University of Minnesota	Veterinary Medicine	66.63	Estimate Aug. 1976 Completion 1979

* Estimated cost includes: Fees such as architectural, engineering, contingency, supervision, inspection, legal, tests and borings; total building work; fixed and movable equipment; site improvements; and on-site utility connecting lines. Not included are costs of land and streets.

** UN-L has central cooling capacity adequate to add CVM, so two water chillers @ $60,000 plus $50,000 for other cooling equipment deducted to make comparable to UN-L.

Source: Survey form completed by University officials in September 1975 (See Appendix G).

Calculation of Capital Cost

Analysis of the existing space in the five universities which may be shared, and the total space requirements of the CVM revealed an excess of certain functional areas and an absence or deficiency of other essential components. Clinical teaching and patient care facilities and specialized student learning areas are absent; laboratory and office space for faculty and nonacademic staff is deficient. The results of this analysis are summarized in Table 8.9. The space which is functionally appropriate and can be shared regularly and with certainty at Montana State University, the University of Nebraska-Lincoln, North Dakota State University, South Dakota State University and the University of Wyoming totals 156,254 GSF. Subtraction of this figure from the total 378,454 GSF required by the CVM yields a balance of 222,200 GSF of new facilities to be built at UN-L; primarily, a veterinary teaching hospital and specialized student learning areas. The other four participating universities have adequate space for the 11 to 18 first year veterinary students in attendance at any one time.

Multiplication of 222,200 GSF by the $63.00 estimated construction cost per GSF (determined in the previous section) yields $13,998,600, rounded to $14,000,000, as the total capital funds required.

TABLE 8.9 Cost of Addition to Existing Facilities

Space	NASF	GSF	NASF	GSF	Cost of Addition 1975
Total Space Required for CVM			245,995	378,454	
Existing Space to be Used Regularly*					
UN-L	65,478	100,735			
MSU, NDSU, SDSU, UW	36,087	55,519			
Subtotal Existing Space			101,565	156,254	
New Addition Required			144,430	222,200	
Total Capital Cost $63.00/GSF** x 222,200 GSF = $13,998,600 rounded to					$14,000,000

* The net assignable square feet (NASF) used here is not equivalent to total space which might be available at any given time. Rather it is functionally appropriate NASF to be relied upon with certainty and regularity.

** Clinical Sciences facility (268,000 GSF) at Kansas State University, comparable to addition required for Regional CVM, was bid August 21, 1975 at $62.81 per GSF. See text on cost estimates or actual construction bid on seven veterinary medical facilities in North Dakota, Nebraska, Colorado, Minnesota and Kansas between January 1974 and August 1976.

EQUITABLE FINANCING OF CAPITAL COSTS

Potential sources of capital funds, other than state appropriated, were identified in Chapter Seven as follows: U.S. Department of Health, Education, and Welfare (HEW), the Old West Regional Commission (OWRC), and Revenue Bonds. Foundations, industry and private donors rarely provide significant capital funds for veterinary colleges. In 1975, Congress passed a continuing resolution which extended to June 30, 1976, the provisions of the Health Manpower Act of 1971. Support of construction beyond June 30, 1976, requires new authorization by Congress. The Old West Regional Commission is presently authorized to provide matching capital funds for demonstration projects. In addition, the Commission is preparing a regional economic plan which after approval will result in new authority to supplement federal grant-in-aid programs.

Development of alternate financial plans adhered to one inviolable principle: each participating state shall contribute its share of the costs based upon the number of its residents that will use the facility.

Table 8.10 presents three alternate plans for financing the $14,000,000 of capital funds required for the Northern Plains College of Veterinary Medicine.

Plan "A"

Plan "A" assumes that the U.S. Department of HEW will not receive authorization to continue grants for construction of veterinary college facilities. Under Plan "A" the OWRC provides 40 percent of the capital funds ($5.6 million) over a period of three years. Sixty percent of the cost is borne by the Old West states. Equitable sharing of the cost among the five states is based upon the number of students (residents) from each state who will be enrolled in the CVM. Nebraska having 38 percent of the enrollment (see Chapter Three) appropriates 38 percent of the capital funds to be provided by the five states; $3,192,000 over a period of three fiscal years.

The remainder of the enrollment is apportioned 18 percent to Montana, 15 percent to North Dakota, 18 percent to South Dakota and 11 percent to Wyoming. It is infeasible for these four states to appropriate capital funds for construction outside of their respective borders. Therefore, according to Plan "A" the capital requirements for the states of Montana, North Dakota, South Dakota and Wyoming are financed by City of Lincoln, Nebraska revenue bonds.*

Under statutory authority and the City Charter, the City of Lincoln may finance construction of the veterinary college facility. The regional CVM may lease the facility and pay an annual rental to the City of Lincoln at a rate calculated to amortize the loan over a period of 30 years (6,7). The title to the facility reverts to the regional CVM when the loan is paid. It is also desirable for the regional CVM to have an option to purchase, at a price to be computed at the time of the exercise of the option, so that neither the CVM nor the City of Lincoln gains or loses. The CVM may wish to exercise the option if private or other funds become available.

Revenue for payment of the annual rental is derived from fees for use of the facility prorated among Montana, North Dakota, South Dakota, and Wyoming on the basis of the number of DVM student spaces allotted to each respective state. Since Nebraska prepays its facilities use fee by appropriating its full share (38 percent) of capital funds prior to the start of or during construction, Nebrasks will not pay a use fee.

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* This feature is also part of Plan "B" and Plan "C".

Optimal terms will be sought at the time financing is needed; however, Table 8.10 presents one example according to interest rates and terms prevailing in October 1975. At the rate of 8.5 percent interest for a 30-year loan, $93.05 per year will amortize $1,000. Legal and other fees for preparation of a lease agreement, printing bonds, advertising, and bond registration are estimated at $35,000. Addition of these fees to the net amount to be financed ($5,208,000) yields the total amount to be financed $5,243,000. The annual cost of amortizing this amount is $487,861.15 ($5,243 thousands x $93.05 per thousand).

The annual facility use fee per student is $2,067.21, rounded to $2,067, when calculations, $487,861.15 ÷ 236, are based upon 236 residents (Montana 68, North Dakota 56, South Dakota 68, and Wyoming 44).

Plan "B"

Plan "B" differs from Plan "A" by showing 50 percent funding by the OWRC and 50 percent by the five states. Equitable sharing of the cost among the states results in an appropriation of capital funds by Nebraska totaling $2,660,000 over a period of three fiscal years. The share of the capital funds for the states of Montana, North Dakota, South Dakota, and Wyoming is financed.* These four states will amortize a loan by paying an annual fee for use of the facilities, amounting to $1,724.97, rounded to $1,725, per student space allocated to each respective state.

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*City of Lincoln, Nebraska revenue bonds as in Plan "A" and Plan "C".

Plan "C"

Plan "C" assumes that the U.S. Department of Health, Education, and Welfare will receive continuing authorization to make grants to colleges of veterinary medicine for construction of facilities. Although HEW is authorized until June 30, 1976, to grant up to 80 percent of the cost of construction, Plan "C" (reflecting the current mood of Congress) shows HEW participation at the more realistic level of 25 percent. The OWRC in this plan contributes 25 percent and the five Old West states provide 50 percent. Nebraska's total capital contribution is $2,660,000 over a three-year period in lieu of paying an annual facilities use fee. The annual facility use fee is $1,725 per student space apportioned to Montana, North Dakota, South Dakota, and Wyoming.*

At the time a decision is made to establish the regional CVM, it is recommended that the formula for funding be revised to obtain maximum Department of HEW participation.

Start-up Costs

In each of the plans described above, it is apparent that construction costs will be incurred several years before the college has reached full enrollment of four classes. Such costs may be designated start-up costs. Those states charged a use fee to amortize the construction loan, can provide their start-up costs by annually paying their full fee based upon 100 percent of the student spaces allocated to them. For example, the college will have only one class enrolled during the first year of operation, two classes in the second year, three classes in the third year, and four classes in the fourth year of operation. The annual use fee during years one, two and three must be the same as year four to cover the annual cost of amortizing the loan.

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* Use fee identical to Plan "B".

TABLE 8.10 Alternate Plans for Financing Construction Costing $14,000,000

	Percent Matching Funds (Numbers in Millions)			Percent Use of Facility by Residents from Each State		MT, ND, SD, and WY Share Financed by City of Lincoln Revenue Bonds Amortized by a Use Fee		
Plans	U.S. Dept. HEW(1)	OWRC	Five States Total	38% Used by Students of NE Therefore Nebraska Appropriates	62% Used by Students of MT 18% ND 15 SD 18 WY 11 Total to be Financed	Fees for Lease and Bonds(2) Add $35,000	Annual Cost of Amortizing $93.05 per $1000 (3)	Annual Use Fee Per Student from MT SD ND WY(4)
A	0%	40% $5.6	60% $8.4	$3,192,000	$5,208,000	$5,243,000	$487,861.15	$2,067.21
B	0%	50% 7.0	50% 7.0	2,660,000	4,340,000	4,375,000	407,093.75	1,724.97
C	25% $3.5	25% 3.5	50% 7.0	2,660,000	4,340,000	4,375,000	407,093.75	1,724.97

(1) Congress passed a continuing resolution authorizing Dept. of HEW participation until June 30, 1976.

(2) Legal, advertising, printing, bond registration fees.

(3) Rate: 8.5% for 30 years. Example Plan "A": $5,208,000 + $35,000 = $5,243. (000) x $93.05 per thousand = $487,861.15 annual payment to amortize loan.

(4) Total DVM students is 384 less 148 Nebraska = 236 residents of MT, ND, SD, and WY. Example Plan "A": $487,861.15 annual fee ÷ 236 students = $2,067.21 per student per year.

SUMMARY AND RECOMMENDATIONS

University owned land, which is available for the Northern Plains CVM, need not be purchased. An inventory shows that the participating universities have facilities plus land with a 1975 replacement value of over $25 million, which may be shared and serve as part of the regional college. Comparison of the total space required for the CVM with the inventory of existing space revealed unmet needs for clinical teaching and patient care facilities, specialized student learning areas, and faculty offices and laboratories. Calculation of unmet space requirements yielded 222,200 gross square feet. The total project cost of this addition to the existing facilities at UN-L was estimated at $14 million.

Three alternate plans proposed for financing the total capital are as follows: (A) 40 percent by the Old West Regional Commission and 60 percent by the five participating states prorated on the basis of the number of student spaces allocated to each state; (B) 50 percent by the OWRC and 50 percent by the states; and (C) 25 percent by the U.S. Department of Health, Education, and Welfare, 25 percent by the OWRC, and 50 percent by the states. For example, under Plan "A" the OWRC provides $5.6 million over a period of three fiscal years; Nebraska having 38 percent of the enrollment appropriates 38 percent of the five state's share or a total of $3,192,000 over a period of three fiscal years. The remainder, 62 percent of the student spaces, is apportioned 18 percent to Montana, 15 percent to North Dakota, 18 percent to South Dakota, and 11 percent to Wyoming. It is infeasible for these four states to appropriate capital funds for construction outside of their respective borders; therefore, 100 percent of the capital requirements for these four states is financed by City of Lincoln, Nebraska revenue bonds. Revenue for payment of the annual cost of amortizing the loan is derived from a fee of $2,067 in Plan "A" (or $1,725 in Plans "B" and "C") per student space allotted to Montana, North Dakota, South Dakota and Wyoming. Nebraska prepays its full share (38 percent) of the capital funds prior to the enrollment of students, in lieu of paying an annual facilities use fee.

Any one of the above plans is judged to be highly feasible.

At the time a decision is made to establish the regional CVM, it is recommended that the college leadership seek maximum HEW funding and that the formula for financing be revised to reflect maximum HEW participation.

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CHAPTER 9

OPERATING COSTS

The five departments of veterinary science, or equivalent, are currently funded for preveterinary education, graduate education, diagnostic service, research, and extension; therefore, the cost of expanding the above departments into the Northern Plains College of Veterinary Medicine is primarily for addition of the DVM degree program. The approach to estimating the total operating cost for the regional college follows two paths. First, determination of the education cost per student per year as the basis for calculating the total cost of adding the DVM degree program to the five existing departments; and second, development of an inventory of the current level of funding for selected programs in those five departments which ordinarily and regularly are conducted by a CVM. The aggregate of the results derived from the above two paths will represent the total operating costs.

This chapter will also, (a) delineate the sources of income when the college attains maximum enrollment, and (b) compare the per student cost of the Northern Plains CVM with the level of contract payments proposed to states in the Region by veterinary colleges outside of the Region.

ANNUAL EDUCATION COST PER STUDENT IN THE DVM PROGRAM

The senior author of this report served as an adviser to the National Academy of Sciences in a comprehensive study of the cost of education in the health professions. The study was requested by Congress in a series of legislative charges set forth in Section 205 of the Comprehensive Health Manpower Act (Public Law 92-157). The report entitled "Costs of Education in the Health Professions - Parts I and II" was published by the National Academy of Sciences, Institute of Medicine, in January 1974 (1). The annual per student educational cost was determined for colleges of medicine, veterinary medicine, dentistry, optometry, osteopathy, pharmacy, podiatry, and nursing.

Methodology

Field studies were conducted at 82 colleges of the nation's eight health professions, including 5 colleges of veterinary medicine, to determine all expenditures for education.* The amount of time spent by faculty and staff in activities relevant to education was also specifically identified. Three alternative approaches were considered in the development of the annual education cost per student: (a) net expenditures approach, (b) program cost approach, and (c) constructed cost approach.

The net expenditures approach--the one adopted in the study--provides a simple, direct, and verifiable means for computing operating costs. This method utilizes data on expenditures subject to audit of each of the existing colleges. Distortions may result from omissions of noncash costs such as volunteer faculty and partial costs of the veterinary medical program assumed by other colleges on the university campus.

The program cost approach assigns the value of all of the resources that are used in an institution to programs in the college, whether or not financial transactions are involved or reflect the full resource cost. The allocation of costs to each of the programs is difficult and subject to judgment because many individuals in a school are engaged, often simultaneously, in activities of different programs. Because (a) few colleges of veterinary medicine have utilized program budgeting, (b) the results are not subject to financial audit, and (c) program allocation is difficult, this method was considered inappropriate.

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*As part of the above named research effort.

The constructed cost approach is a theoretical model for a college constructed by experts. Resource requirements for all the activities contributing to the programs are developed for the prototype college after the objectives and environmental characteristics are carefully defined. As this approach seeks reliable judgments from experts in the field as to what resources are adequate for programs in an acceptable model college, this method was judged to (a) perpetuate biases resulting from the experiences of the experts and (b) yield results which may be construed as theoretical and unconvincing. Therefore, this approach was abandoned in favor of the net expenditures method.

In brief, the methodology used to determine education costs included computation of direct teaching activities, faculty costs, nonfaculty costs, that portion of patient care and investigation essential for clinical instruction, and general support or indirect costs. Facility depreciation was determined by applying standard accounting methods to acquisition costs (1).

Results of Calculations

The average total education cost per veterinary medical student was found to be $7,520 in 1972-73. The next step is to escalate this figure to October 1975. The research economist, D. Kent Halstead of the Bureau of Postsecondary Education, U.S. Department of Health, Education, and Welfare, reported the rate of inflation of educational costs in his study Education Prices and Price Indexes, 1961-74. A supplement, that brings his data up through June 30, 1975, will be published by the U.S. Government Printing Office in the fall of 1975 (2). Halstead reported inflation of higher education costs at the rate of 7.0 percent in 1973-74 and 8.6 percent for the fiscal year ending June 30, 1975. It is assumed that the 8.6 percent annual rate continued until the date of this writing, October 16, 1975. Escalation of $7,520 from June 30, 1973 to October 16, 1975 brings the annual direct and indirect cost of education per veterinary medical student to $8,959. Multiplying $8,959 by 384, the number of enrollees, yeilds $3,440,256, the total operating cost for adding the DVM degree program to the five departments of veterinary science. A later section will show that only $5,756 per student per year is provided by state funds.

Direct as well as indirect costs are included in the above calculations; the following will show the breakdown between the two categories. Indirect costs are defined as those that cannot be traced to specific items in the college budget. Indirect costs include many fixed items in the university budget for services, such as student admissions and records, utilities, safety, health, parking, general administration and data processing. The indirect cost rate at the University of Nebraska-Lincoln is 12.5 percent of expenditures for direct costs (3). This rate is comparable to that of a university in a neighboring state. The distribution of the total education cost of $8,959 per student is $7,964 for direct costs and $995 (12.5 percent of direct costs) for indirect costs (3).

CURRENT LEVEL OF OPERATING FUNDS RELEVANT TO CVM

The five Departments of Veterinary Science in the Region have several ongoing programs which represent functions ordinarily and regularly performed by a veterinary college. The goal is to add the DVM degree program along with the full funding for the DVM program to those Departments without duplicating existing programs. The objective of this section is to identify the operating costs of existing programs which are relevant to the CVM but need not be duplicated.

Questionnaires completed by the five veterinary science departments, followed by verification during interviews with each chairman, provided an inventory of operating expenditures and the number of personnel engaged in diagnostic laboratory service, research and related graduate education, and extension. Compilation of the data for fiscal year 1975 is summarized in Table 9.1. The five departments have a total of 55.53 FTE professional personnel and 86.82 FTE supporting staff engaged in functions ordinarily and regularly performed by a CVM. Funds totaling $2,569,754 were expended in fiscal 1975 as follows: $1,001,751 for diagnostic laboratories, $1,414,132 for veterinary medical research and related graduate education, and $153,871 for veterinary extension. State funded or nonstate sources for graduate and continuing education in the amount of $242,781 will also be available when the CVM is opened (See Table 9.2).

TABLE 9.1 Inventory of Personnel and Operating Funds in Departments of Veterinary Science for Diagnostic Laboratories, Research and Extension

Function	Number of FTE Personnel		Funds Expended in Fiscal 1975
	Professional	Support Staff	
Diagnostic Laboratories	19.75	50.40	$1,001,751
Veterinary Research	32.28	35.92	1,414,132
Veterinary Extension	3.50	.50	153,871
Total	55.53	86.82	$2,569,754

Source: Questionnaire and Data Compilation (Appendix A and Appendix D).

SUMMARY OF INCOME TO DEFRAY TOTAL OPERATING COSTS

Table 9.2 summarizes the sources of operating income for the CVM, including currently funded, relevant veterinary science programs plus the sources of income for adding the DVM degree program. Sources of funds are grouped as follows: $2,569,754 identified as funded diagnostic, research and extension activities in veterinary science departments; $252,781 representing funded or nonstate sources for graduate and continuing education; $1,229,952 from private and federal sources ($3,203/student) to add the DVM degree program; and $2,210,304 from state appropriations ($5,756/student) to add the DVM degree program. Summation of the above sources yields the total operating cost--$6,262,791.

Consideration of alternate plans lead to the conclusion that operating costs can most equitably be shared among the participating states in proportion to the number of student spaces allocated to each state. On this basis, $5,756 per student per year from state funds (64 percent) and $3,203 per student per year from federal and private sources (36 percent) will provide the total operating funds required for adding the DVM degree program. The $3,203 per student per year from private and federal sources is derived from tuition $780, federal capitation grant $1,123, and hospital income $1,300. Tuition, the same as that charged medical students at the University of Nebraska College of Medicine, is calculated at $240 per quarter ($360/semester) for 13 quarters prorated over 12 quarters. The federal capitation grant of $1,123.25 rounded to $1,123 is the amount awarded to the Ohio State University College of Veterinary

Medicine in 1975 for each DVM student enrolled in the fall of 1974. Hospital income of $1,300 per student is based upon the 60th percentile of 17 U.S. veterinary college teaching hospitals in fiscal 1975.

TABLE 9.2 Summary of Income to Defray Total Operating Costs(1)

Total Annual Operating Costs			$6,262,791
Currently Funded Programs in Vet. Sci.(2)			
Services:			
Diagnostic laboratories	1,001,751		
Veterinary medical research	1,414,132		
Veterinary medical extension	153,871		
Subtotal		2,569,754	
Programs Funded or Nonstate Sources			
Graduate and Continuing Education:			
Tuition $693.75 x 35 FTE non-exempt(3)	24,281		
Tuition $40.00 x 1,600 cont. educ.(4)	64,000		
Federal-state $4,700 x 35 FTE grad.	164,500		
Subtotal		252,781	
Private and Federal to Add DVM Degree Program			
Tuition $780 x 384 students(5)	299,520		
Federal capitation $1,123 x 384(6)	431,232		
Hospital income $1,300 x 384(7)	499,200		
Subtotal		1,229,952	
Less Subtotal			4,052,487
Total State Appropriation to Add DVM Program $5,756 x 384 students(8)			$2,210,304

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(1) In 1975 dollars at maximum enrollment; all students enrolled in a 12-month year-round program except for two summer quarters in the DVM curriculum.

(2) Survey of departments of veterinary science (Appendix A and D).

(3) Rate for UN-L Graduate College, two semesters plus summer session.

(4) Average annual fees per student over two years at Ohio State University, College of Veterinary Medicine.

(5) Same as UN-L, College of Medicine, 13 quarters @ $240 pro-rated over 12 quarters.

(6) Actual 1975 award to Ohio State University, College of Veterinary Medicine was $1,123.25 per DVM student enrolled Fall 1974.

(7) 60th percentile of 17 U.S. veterinary college teaching hospitals in fiscal 1975.

(8) Annual cost of education per DVM student after deducting $3,203 per student derived from nonstate sources.

ANNUAL COST OF CONTRACTS VERSUS ANNUAL COST OF PROPOSED CVM

The per student cost of the Northern Plains College of Veterinary Medicine is compared with the level of contract payments for veterinary education proposed to states in the Region. The contract fee per DVM student for the current (1975-76) academic year is based upon direct and indirect "costs of education" computed from the actual expenditures for DVM education during the immediate prior (1974-75) year plus a "facilities use" fee. That portion of the cost of education which is derived from federal education grants, tuition paid by the students, and income from professional service rendered at the teaching hospital are deducted from the total education cost to arrive at the contract fee.

Table 9.3 shows the annual contract payments per DVM student for direct and indirect costs of education and for use of facilities at two veterinary colleges outside of the Region in comparison with the per student cost of the proposed CVM (4,5). The total state costs per student (education plus facilities) at the Northern Plains College of Veterinary Medicine is $7,823 under plan "A" and $7,481 under plan "B". Annual state costs under both plans are well below the total contract fees proposed by the colleges of veterinary medicine at the University of Minnesota ($11,679) and Colorado State University ($8,500). Considered separately, the annual education cost and the facility use cost for the Northern Plains CVM both fall in an intermediate position between the proposed contract fees. Nebraska prepays its share of capital in both plans in lieu of paying a facilities use fee; therefore, Nebraska pays only the annual education cost.

TABLE 9.3 Comparison of Per Student Cost of Contracts Versus Per Student Cost of Northern Plains College of Veterinary Medicine

College of Veterinary Medicine	Proposed Annual Fee Per DVM Student(a)		
	Education	Facilities	Total
Northern Plains Plan "A"	\$5,756(b)	\$2,067(c)	\$7,823
Plans "B" & "C"	5,756	1,725	7,481
University of Minnesota(d)	11,186	493	11,679
Colorado State University(e)	5,120	3,380	8,500

(a) Figures rounded to nearest whole number. Payable for academic year 1975-76.

(b) Total fee paid by Nebraska because facility fee is prepaid.

(c) Per student annual fee (Plan "A" \$2,067.21 or Plan "B" \$1,724.97 rounded), from Table 8.10, Chapter 8. Per student fees in Plan "C" and Plan "B" are identical.

(d) Contract proposal received by the University of Nebraska-Lincoln from the University of Minnesota dated January 15, 1975.

(e) Memorandum received by Montana State University from the Western Interstate Commission for Higher Education, dated March 27, 1975, and data updated by Dean W.J. Tietz of Colorado State University on October 31, 1975.

It should also be noted that part of a state's payments is returned to the university in that state which offers part of the DVM degree program.

Comparison of the contract fee with the per student cost of the proposed college indicates that it is economically attractive and feasible for the Region to establish its veterinary college.

Economic Advantages of the Northern Plains Colleges of Veterinary Medicine over Contracting

1. The five participating states have existing veterinary science facilities, personnel and operating funds which can readily and feasibly be expanded into a CVM.

2. The total annual per student cost (education plus facilities use) to the states is less than total annual per student contract fees.

3. Veterinary students receive all or part of their education in their home state; therefore, part of each state's payment for operating costs is returned to the university in its state.

4. Graduates from veterinary colleges tend to practice in the state where they received their DVM or post DVM clinical education; therefore, the new CVM will reduce the migration of highly qualified young people to states outside of the Region. In 1974, Nebraska published its contracting experience with out-of-state veterinary colleges. From 1959 to 1974 sixty per cent of the graduates did not return to their home state; thus sixty percent of the state's investment in DVM education is lost (4). North Dakota experienced a 61 per cent loss.

TIMETABLE FOR DEVELOPMENT
OF THE NORTHERN PLAINS COLLEGE OF VETERINARY MEDICINE

Operating as well as capital costs incurred between the time a decision is made to establish the college and the time students are enrolled are minimized by adhering to the shortest possible timetable. The schedule proposed here for specific decisions and actions is optimistic yet quite feasible if leaders and groups make decisions in a reasonable period of time. Table 9.4 summarizes the key decisions and the approximate date for each action.

After the OWRC has approved the "Feasibility Study" and the universities have adopted the proposal in principle it is essential to initiate planning. The planning team includes: University planners, the Dean of the CVM, chairmen of the veterinary science departments, a small number of key faculty, director of the physical plant, architects, engineers, specialty consultants, and attorneys.

The plan shall involve (a) program decisions; coordination of the input from five participating universities; (b) development of a detailed program of space requirements; (c) preliminary architectural drawings; (d) updated capital cost estimates; (e) preparation of applications for federal grants; and (f) writing of model legislation and a preliminary lease agreement.

The cost of the above planning includes: Stipends and fringe benefits; fees; payment to the universities for release time for faculty and other professionals; travel; rentals; equipment; materials, and indirect costs. The estimated costs of the above items totals $500,000. It is recommended that the cost of regional planning be funded by the OWRC.

This recommendation is justified because planning a regional CVM represents one of the most compelling ways for the OWRC to pursue several of its stated goals which will:

1. Develop natural and human resources and increase skills as part of an effort to expand industrial and business opportunities;
2. strengthen and expand the economic base through programs directed at halting out-mitration, raising median family income, and providing additional job opportunities; and
3. enhance the quality of life through improved educational opportunities (7).

The Northern Plains CVM will be a highly effective force to increase animal production by reducing the losses attributed to livestock diseases. The OWRC, by supporting planning of the regional CVM can make a momentous impact on the economic development of the livestock inductry and animal agribusiness in the Region.

Table 9.4 Timetable for Development of the Northern Plains College of Veterinary Medicine

Date	Decisions or Actions
Feb. 1976	Approval of "Feasibility Study" by the OWRC. Authorization by the OWRC of $500,000 for planning the Northern Plains CVM. The planning shall include: program decisions, coordination with participating universities, detailed program of space requirements, preliminary architectural drawings, updated capital cost estimates, application for federal grant, lease agreement, and model legislation. Funds for planning shall be released after three of the five universities adopt the "Feasibility Study" _in principle_.
Apr. 1976	Adoption _in principle_ by the cooperating universities of the proposal to establish a Northern Plains College of Veterinary Medicine; appointment of a dean, consultants, and planning staff.
Jan. 1977	Approval of the program and facility plans by the cooperating universities.

	Approval of the program and facility plans by the OWRC.
	Model legislation available for presentation to the state legislatures.
Feb. 1977	Review of plans with the AVMA Council on Education.
June 1977 to June 1979	Decisions by legislatures to establish a Northern Plains CVM and initial appropriation of operating funds by the cooperating states and capital funds by Nebraska.
	Apply to AVMA Council on Education for pre-accreditation evaluation of plans for programs and their implementation to achieve status of "reasonable assurance" of accreditation. Begin architectural and engineering work. Apply to Commissioner, U.S. Office of Education, for "Certificate of Reasonable Assurance of Accreditation."
	Apply to U.S. Dept. HEW for construction grant, if Congress has renewed authorization.
July 1979	Start construction.
	Continue faculty recruitment, and detailed curriculum planning.
Aug. 1981	Complete construction.
Sept. 1981	Admit first class.

CONCLUSIONS AND RECOMMENDATIONS

Operating costs were estimated in accordance with the concept that the Northern Plains College of Veterinary Medicine can be established by adding the DVM degree program to the five participating departments of veterinary science. In fiscal 1975 those departments expended $2,569,754 for diagnostic, research, and extension activities. When the CVM is operating it is estimated that those departments will expend $252,781 from funded or nonstate sources for graduate and continuing education.

It is concluded that the annual operating costs for addition of DVM education is $3,440,256; $1,229,952 being supplied by private and federal sources and $2,210,304 from the states.

It is recommended that operating costs be equitably shared among the participating states in proportion to the number of student spaces allocated to each state. On this basis $5,756 per student per year from state funds (64 percent) and $3,203 per student per year from federal and private sources (36 percent) will provide the total operating funds for adding the DVM degree program.

It is concluded that the Northern Plains College of Veterinary Medicine is feasible in all respects. In fact, the new college is economically more feasible than contracting for DVM education for the following reasons:

(A) The total annual per student cost (education plus facilities use) to the states is less than total annual per student contract fees proposed by veterinary colleges outside of the Region.

(B) Veterinary students receive all or part of their education in their home state; therefore, part of each state's payment for operating costs is returned to the university in its state.

(C) The Regional CVM provides part of the DVM education (including clinical education) in the student's home state. This strategy is designed to (a) retain highly qualified young graduates in underserved rural areas, and (b) minimize the loss of human and financial resources experienced with contracts (60 percent loss of graduates and 60 percent loss of the State's investment in veterinary education is Nebraska's and North Dakota's experience with contracts).

A timetable was evolved to present a schedule for specific decisions and actions required for development of the CVM. If individuals and groups take appropriate actions, as scheduled, the Northern Plains CVM can admit its first class no later than September 1981. As the first step for implementation of the CVM, it is recommended that early in 1976, the OWRC fund a planning study at a cost of approximately $500,000. It is further recommended that the plan include: program decisions; coordination of the input from the five universities; development of a detailed program of requirements; preliminary architectural drawings; updated cost estimates; and writing of model legislation and a preliminary lease agreement.

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APPENDIX A

QUESTIONNAIRES FOR CANDIDATE UNIVERSITIES

INFORMATION NEEDED FOR A STUDY ON THE FEASIBILITY OF ESTABLISHING A COLLEGE OF VETERINARY MEDICINE TO SERVE THE OLD WEST REGION

GENERAL UNIVERSITY INFORMATION

Name of University ______________________________

Official serving as liaison between the university and researchers studying the feasibility of establishing a regional college of veterinary medicine to serve Montana, Nebraska, North Dakota, South Dakota, and Wyoming:

Name ______________________________

Address ______________________________

Telephone Number ______________________________

1. List the University's past (with dates) and current actions which indicate the institution's interest in establishing a college of veterinary medicine on its campus. (Attach documents.)

____

____

____

____

____

____

2. The legislative climate for support of a college of veterinary medicine (CVM) in this state may be judged to be: excellent, good, average, poor. (Please circle the applicable rating.)

3. Veterinarians in this state favor establishment of a state or regional CVM: enthusiastically, moderately, not at all. (Please circle.)

4. The University will assign a minimum of 35 acres of its campus land as a site for the proposed CVM. (Please circle.) Yes

No

a) Maximum number of acres which can be assigned ______________.

b) The following list describe the terrain of the land: (Circle applicable.)

Low, medium, or high elevation compared to existing colleges on campus

Flat or rolling

Well drained or swampy

Soil is rocky, sandy, or loam

(Please attach a campus map showing relationship of site to existing University buildings.)

c) Is public transportation available to a point within 10 minutes walking time to the site. (Please circle.) Yes

No

d) The ______________________ (name) airport with regularly scheduled airlines is located _________ miles (_________ minutes by car) from the proposed site of the regional CVM.

e) The following highways provide access for cars and livestock trucks to the proposed site of the regional CVM from Montana, Nebraska, N. Dakota, S. Dakota, and Wyoming:

____

____

____

____

5. There is a library within 10 minutes walking time from the proposed campus site for the CVM. (Please circle.) Yes

No

a) The library contains _________ net square feet of space which the University will assign to the proposed CVM.

b) The library provides the following computer based services: (Please check yes or no and indicate years available.)

Service Area	Retrospective			Current Awareness	
	No	Yes	Years Inclusive	No	Yes
Multidisciplinary					
MARC Machine Readable Cataloging					
SCI Science Citation Index					
NTIS National Technical Information					
CICP Current Index Conference Papers					
Current Programs					
Pandex (journals additional to SCI)					
Education					
Research in Education					
Current Index to Journals in Education					
Social Science					
MARC					
SSCI Social Sciences Citation Index Source Tapes					
Agriculture					
CAIN					
Chemistry					
Chemical Titles Current Issue					

6. The following teaching facilities are located within 10 minutes walking time from the site of the CVM and are available for assignment to veterinary students:

Names of Buildings	Number of Student Stations (S) and Total Number of Hours (H) Available During Monday Through Friday																					
	Lecture		Chemistry Lab		Microbiology Lab		Physiology Lab		Anatomy Dissection		Pathology Lab		Seminar		Library		Histology Lab		Autotutorial		Biology Lab	
	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H

7. The following research laboratories are available for assignment to the proposed CVM:

Name of Building	Net Sq. Ft.	Discipline for which Laboratory Is Designed

8. The following housing operated by the University will be reserved for veterinary students:

	Number of veterinary students for which housing will be reserved	
	1978	1981
Dormitories		
Apartments		

9. The University will assign 150 acres of land for a veterinary research farm located adjacent or __________ miles from the proposed site for the CVM.

   a) The maximum number of acres which can be assigned is __________.

   b) The prevailing winds at the proposed research farm come from the ________________ direction.

   c) The following best describe the terrain of the land:

      Low, Medium, or high elevation compared to the general area.

      Flat or rolling

      Well drained or swampy

      Soil is rocky, sandy, or loam

   d) Atmospheric temperatures recorded for the area in 1974 ranged from a low of __________ degrees to a high of __________ degrees.

   (Please attach a map showing location of farm in relationship to the proposed site of the CVM.

10. Distance from the proposed site for the CVM and the nearest existing or proposed and funded medical college is __________ miles.

11. The University offers the following programs:

Name of Program	City Where Located
College of Medicine	
School of Public Health	
College of Podiatry	
College of Dentistry	
College of Optometry	
College of Pharmacy	
School of Nursing	
Allied Health Sciences:	
Medical Technology	
X-ray Technology	
Write in others:	

12. Exhibits attached. Include one copy of the following:

a) Annual Report of the University, 1973-1974

b) Fiscal Report, July 1, 1973 -- June 30, 1974

c) Land use plan for the campus

d) Map of University showing potential sites for a College of Veterinary Medicine.

e) Map showing proposed location of veterinary medical research farm and relationship with proposed site of veterinary college.

f) Most recent catalogs or bulletins for:
   University
   College of Agriculture
   College of Medicine

INFORMATION NEEDED FOR A STUDY ON THE FEASIBILITY OF ESTABLISHING A COLLEGE OF VETERINARY MEDICINE TO SERVE THE OLD WEST REGION

ORGANIZATION FOR ADMINISTRATION OF RESEARCH

Name of university ____________________ Address ________________________

A. General Information

Name of Organization _________________________________

Director ____

Assistant Director(s)

____

____

B. Funding

Grants, Contracts and Gifts Received for 1973-74 Fiscal Year

	Amount			Total
	Grants	Contracts	Gifts	
Biomedical				
Agricultural Research				
All other areas				
Total				

C. Addendum

Please attach latest copy of Annual Report on research for the university.

INFORMATION NEEDED FOR A STUDY ON THE FEASIBILITY OF ESTABLISHING A COLLEGE OF VETERINARY MEDICINE TO SERVE THE OLD WEST REGION

COLLEGE OF AGRICULTURE (OR EQUIVALENT) QUESTIONNAIRE

Name of university ____________________ Address ______________________

A. General Information

Dean ____

Associate or Assistant Deans	Areas of responsibility
__________________________	_____________________________
__________________________	_____________________________
__________________________	_____________________________
__________________________	_____________________________

Please check the degree(s) you offer in the College of Agriculture:

B.S. _____ Ph.D. _____

M.S. _____ Other (describe) ________________

Number of students enrolled in the College of Agriculture:

Freshmen ________ Seniors ________

Sophomores ________ Graduates ________

Juniors ________ Technical ________

Number of students indicating a pre-veterinary medicine major ________

B. Agricultural Experiment Station

Do you have an agricultural experiment station at your university?

_____ yes

_____ no

If answer is yes, please describe your animal and poultry research program pertaining to the following: (FTE equals full-time equivalent.)

	Number of FTE investigators				Expenditures 1 July 1973 through 30 June 1974 (exclude capital improvements)
	animal		poultry		
	D.V.M.	Ph.D.	D.V.M.	Ph.D.	
Physiology					
Nutrition					
Reproduction					
Diseases of Animals					
Other animal and poultry					
Total					

C. Diagnostic Laboratories

Is there a state diagnostic laboratory or branch in your area? yes ____ no ____

If yes, please answer the following:

Location ____

Number of accessions 1 July 1973 --June 1974	Number of staff			Expenditures 1 July 1973--30 June 1974 (exclude capital improvement)
	D.V.M.	Ph.D.	Technical	
Poultry				$
Animals				$
Total				$

If there are other diagnostic laboratories in the state, please attach the above information for each.

D. Educational Programs

Do you have an animal technician training program within the university?

yes _____ no _____

Do you have a division of laboratory animal resources to serve the entire university? yes _____ no _____

Educational programs in the divisions of laboratory animal resources

Name of program	Number enrolled		Expected enrollment	Name of degree	Name of certificate
	1973-74	1974-75	1980		
Laboratory animal medicine					
Animal technician					
Other (specify)					

Are there community junior colleges or other institutions in your state offering an animal technician program? yes _____ no _____

If so, please complete the following table.

Location	Enrollment in Animal Technology or equivalent			Name of Degree
	1973-74	1974-75	Expected in 1980	

E. Facilities in the Division of Laboratory Animal Resources

Animal farm in number of acres __________

Other facilities

Facility	Net square feet
Research labs	
Service areas	
Instruction	
Administrative	
Animal housing	
Total	

F. The College of Agriculture operates a veterinary medical extension service. (Please circle.) Yes

No

G. Agriculture Library

General Information

Librarian ______________________________

Number of staff (full-time equivalents) ______________

Number of books (1974-75) ______________________

Number of bound journals (1974-75) ________________

Number of journal subscriptions (1974-75) ____________

Number of Microtexts (1974-75) ___________________

Expenditures

Total expenditures (July 1, 1973-- June 30, 1974) $__________

Space currently available for adding veterinary medicine (net square feet) ______________

Space available in 1978 for adding veterinary medicine (net square feet) ______________

Total net area ____________

H. Number of people and animals of all ages in the 100 square mile area represented by the following counties:

County	Number of People	Number of Animals, All Ages								
		Beef Cattle	Dairy Cattle	Hogs	Sheep & Goats	Horses & Mules	Poultry	Dogs	Cats	Zoo Animals
Gallatin										
Park										
Broadwater										
Jefferson										
North 2/3 Madison										
South 1/2 Meagher										

County	Number of People	Number of Animals, All Ages								
		Beef Cattle	Dairy Cattle	Hogs	Sheep & Goats	Horses & Mules	Poultry	Dogs	Cats	Zoo Animals
Polk										
Butler										
Saunders										
Douglas										
Sarpy										
York										
Seward										
Lancaster										
Cass										
Fillmore										
Saline										
Gage										
Otoe										
Thayer										
Jefferson										
Johnson										
West 1/2 Nemaha										
Pawnee										
West 1/4 Richardson										

County	Number of People	Number of Animals, All Ages								
		Beef Cattle	Dairy Cattle	Hogs	Sheep & Goats	Horses & Mules	Poultry	Dogs	Cats	Zoo Animals
Cass										
Barnes										
East 1/2 Stutsman										
South 1/3 Griggs										
South 1/3 Steele										
South 1/3 Traill										
La Moure										
Dickey										
Ranson										
Sargent										
West 3/4 Richland										

County	Number of People	Number of Animals, All Ages								
		Beef Cattle	Dairy Cattle	Hogs	Sheep & Goats	Horses & Mules	Poultry	Dogs	Cats	Zoo Animals
Deuel										
South 1/2 Codington										
South 2/3 Clark										
1/2 Spink										
East 2/3 Beadle										
Hamlin										
Kingsbury										
Brookings										
Sanborn										
Miner										
Lake										
Moody										
Davidson										
Hanson										
McCook										
Minnehaha										

Laramie

County	Number of People	Number of Animals, All Ages								
		Beef Cattle	Dairy Cattle	Hogs	Sheep & Goats	Horses & Mules	Poultry	Dogs	Cats	Zoo Animals
Albany										
Platte										
East 1/3 Carbon										
West 2/3 Laramie										

DEPARTMENT OF VETERINARY SCIENCE, OR EQUIVALENT

Name of Department ____________________

Chairman ____________ Address ____________ Telephone Number ____________

A. Faculty and Staff

Faculty Classification	Number FTE who are veterinarians	Number FTE who are not veterinarians
Professors		
Associate Professors		
Assistant Professors		
Instructors		
Residents		
Other		

Number of Technical Staff ____________

Number of Office Staff ____________

B. Facilities

Describe the facilities assigned to the Veterinary Science Department.

Land ________ acres

Buildings ____________________

Please attach additional sheets using the following form to describe room utilization.

Name of room	Net square feet			
	Teaching	Research	Veterinary extension	Service
Examples: (teaching laboratory, animal room, faculty office,				
immunology laboratory, etc.)				

C. Expenditures

	Teaching	Research	Extension	Diagnostic service	Other
1973-74					

D. Revenue

1 July 1974--30 June 1975

Sources of Revenue	Amount
	$
	$
	$
	$
	$

E. Curriculum

Please outline the curriculum for pre-veterinary medical students.

Required courses	Credit hours	Elective courses	Credit hours
Total		Total	

F. The following graduate programs for doctors of veterinary medicine are offered:

List of Disciplines	Degrees or Certificates Awarded (check) M. S.	Ph.D.	Intern	Residency
1. Veterinary science				
2. Veterinary physiology				
3. Veterinary parasitology				
4. Veterinary microbiology				
5. Veterinary pathology				
6. Veterinary pharmocology				
7. Others:				

G. Research

List research projects in the Veterinary Science Department during 1974-75.

Titles of Research Projects	Number of FTE Personnel				Budget, July 1974--June 30, 1975
	Professional			Clerical & Technical	
	D.V.M.	Ph.D.	M.S.		
1.					
2.					
3.					
4.					
5.					

H. The following programs of continuing education for veterinarians were or will be conducted under the direction of the department or by faculty of the department during the period July 1, 1974, to June 30, 1975.

Title of Program or Course	Location	Duration

I. Veterinary Science Library

General Information

Librarian ______________________________

Number of staff (full-time equivalents) ______________

Number of books (1974-75) ______________________

Number of bound journals (1974-75) ________________

Number of journal subscriptions (1974-75) ____________

Number of Microtexts (1974-75) ____________________

Expenditures

Total expenditures (July 1, 1973 -- June 30, 1974) $__________

Space currently available for adding veterinary medicine (net square feet) ______________

Space available in 1978 for adding veterinary medicine (net square feet) ______________

Total Net area __________

J. SATELLITE FACILITIES

For purposes of this study, satellite facilities are defined as off-campus institutions, laboratories, and other facilities located within a reasonable distance of the proposed college of veterinary medicine to permit faculty, students, and facility personnel to have cooperative interchange involving instruction, research, and service.

Facility	Name	Location
1. Private research laboratory		
2. University labs for research and education		
3. State and/or Federal biomedical research laboratory		
4. Pharmaceutical laboratory		
5. Nutrition laboratory		

Facility	Name	Location
6. Department of Health laboratory		
7. Meat packing plant		
8. Agriculture research and development center		
9. Toxicology laboratory		
10. Marine animal laboratory		
11. Environmental health laboratory		

Facility	Name	Location
12. State and/or Federal livestock farm		
13. Diagnostic laboratories		
14. Other: Medical Schools		

INFORMATION NEEDED FOR A STUDY ON THE FEASIBILITY OF ESTABLISHING A COLLEGE OF VETERINARY MEDICINE TO SERVE THE OLD WEST REGION

COLLEGE OF MEDICINE

Name of university ____________________ Address ________________________

A. General Information

Dean ____

Associate or Assistant Deans	Areas of responsibility
________________________________	______________________________
________________________________	______________________________
________________________________	______________________________
________________________________	______________________________

Faculty--please give number of professional personnel in full-time equivalents:

Professors (FTE) _______________

Associate Professors (FTE) _______________

Assistant Professors (FTE) _______________

Instructors (FTE) _______________

Student/faculty ratio _______________

B. Expenditures

1 July 1973--30 June 1974

(exclude capital improvement)

	Program			
	M.D.	Graduate Degree	Continuing Education	Allied Health Professions
Total expenditures for Education	$	$	$	$

Total expenditures for Research $_______________

C. Major Sources of Income

1 July 1973--30 June 1974

(exclude income for construction)

Income	Education	Research	Service
State Appropriations and Grants	$	$	$
Federal Grants	$	$	$
Foundations	$	$	$
Earnings	$	$	$
Other	$	$	$
Total	$	$	$

D. Students

Enrollment in these programs:

	1973-74	1974-75	Expected enrollment in 1980
M.D.			
M.S.			
Ph.D.			
Interns			
Residents			
B.S.			
Continuing Education			

Costs

Total cost for educating one medical student from admission to awarding M.D. degree $__________

State basis for computation of the above figure ________________

____

____

H. Non-University Facilities Used in Connection with the School of Medicine

Facility	Name	Location
Hospitals		
State Research Labs		
Federal Research Labs		
Industrial Research Labs		
Other		

Medical Library

General Information

Librarian ____

Number of staff (full-time equivalents) ________________________

Number of books (1974-75) ________________

Number of bound journals (1974-75) ________________

Number of journal subscriptions (1974-75) ________________

Number of Microtexts (1974-75) ___________________

Expenditures

Total expenditures (1 July 1973 - 30 June 1974) ______________

Space currently available for adding Veterinary Medicine (net square feet) ___________________________

Space available in 1978 for adding Veterinary Medicine (net square feet) ___________________________

Total net area _________________________

DIVISION OF LABORATORY ANIMAL MEDICINE OR EQUIVALENT

Name of university ____________________ Address ________________________

A. General Information

Director ____

Faculty Classification	Number FTE who are veterinarians	Number FTE who are not veterinarians
Professors		
Associate Professors		
Assistant Professors		
Instructors		
Residents		
Other		

Number of Technical Staff ________

Number of Office Staff ________

B. Expenditures

1 July 1973--30 June 1974

	Personnel	Operating	Capital improvement	Equipment
Amount	$	$	$	$

C. Revenue

1 July 1973--30 June 1974

Sources of Revenue	Amount
	$
	$
	$
	$
	$

D. Services

Services provided by this division (please check)

_____ Production of research animals

_____ Purchase of research animals

_____ Housing and care for research animals

_____ Consultation--selection, diagnosis and use of research animals

_____ Consultation--planning new animal housing and research facilities

_____ Diagnosis, control, treatment of disease

_____ Preventive medicine

_____ Public relations work on lab animal use

_____ Other (specify)

What organizations utilize the above services?

_____ College of Medicine

_____ College of Agriculture

_____ College of Biological Sciences

_____ University at large

_____ Community at large

_____ Other (specify)

E. Number of people and animals of all ages in the 100 square mile area represented by the following counties :

Animal census (1 July 1973--30 June 1974)

	No. purchased	No. bred and reared		No. purchased	No. bred and reared
Mice			Dogs		
Rats			Cats		
Hamsters			Sheep		
Guinea Pigs			Goats		
Rabbits			Horses		
Gerbils			Pigs		
Degus			Primates		
Other Species			Birds		
(specify)			Frogs		
			Fish		

F. Research

(1 July 1973--30 June 1974)

Name of research projects in your division	Source of funds	Annual amount of award
1.		$
2.		$
3.		$
4.		$
5.		$

Total $________

G. Educational Programs in the Division

Name of program	Number enrolled		Expected enrollment	Name of degree	Name of certificate
	1973-74	1974-75	1978		
Laboratory animal medicine					
Animal technician					
Other (specify)					

List graduate courses offered by your division

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________
10. ______________________________

H. Facilities

Animal farm

Number of acres ________

Facility	Net square feet
Research labs	
Service areas	
Instruction	
Administrative	
Animal housing	
Total	

APPENDIX B

INDIVIDUALS CONTACTED AT CANDIDATE UNIVERSITIES

MONTANA STATE UNIVERSITY

Carl W. McIntosh, President

William A. Johnstone, Vice President for Administration

Roy E. Huffman, Vice President for Research

Irving E. Dayton, Vice President for Academic Affairs

Johan A. Asleson, Dean, College of Agriculture and Director, Agricultural Experiment Station

Lark P. Carter, Associate Dean, College of Agriculture and Assistant Director, Agricultural Experiment Station

Richard E. Dierks, Head, Department of Veterinary Science

Robert L. Blackwell, Head, Department of Animal and Range Sciences

John W. Jutila, Dean, College of Letters and Science

Alice McClain, Director of Libraries

Martin F. Whalen, Director, Physical Plant

Franklin S. Newman, Coordinator, WAMI Cooperative Medical Program

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*Personnel who visited all sites:
Clarence R. Cole, D.V.M., Ph.D.
Burnell W. Kingrey, D.V.M., M.Sc.

UNIVERSITY OF NEBRASKA

D.B. Varner, President

James H. Zumberge, Chancellor

Robert D. Sparks, Chancellor, University of Nebraska Medical Center

Robert J. Prokop, Member, Board of Regents

H.W. Ottoson, Acting Vice Chancellor for Agricultural and Natural Resources

D.P. McGill, Assistant to the Vice Chancellor, Institute of Agriculture

Robert W. Kleis, Acting Director, Agricultural Experiment Station

T.E. Hartung, Dean, College of Agriculture

Perry G. Rigby, Dean, College of Medicine

Harry W. McFadden, Associate Dean for Graduate Studies

F. Miles Skultety, Associate Dean for Clinical Affairs

Gladys M. Beddoe, Assistant Dean for Graduate Medical Education

John E. Aronson, Assistant to the Chancellor

Wayne R. Collings, Librarian at C.Y. Thompson Library

David Bishop, Director of the Library of Medicine

Marvin J. Twiehaus, Chairman, Department of Veterinary Science

Wayne L. Ryan, Assistant Dean for Research

Lee G. Simmons, Assistant Professor, Internal Medicine and Director, Omaha Zoo

Agnes Arthaud, Acting Director of Extension

William Swanson, Vice President

Warren Sahs, Assistant Director, Agricultural Experiment Station

Harley Schrader, Director, Physical Plant

NORTH DAKOTA STATE UNIVERSITY

Laurel D. Loftsgard, President

David G. Worden, Vice President for Academic Affairs

Kenneth A. Gilles, Vice President for Agriculture

Arlon G. Hazen, Dean, College of Agriculture and Director, Agricultural Experiment Station

Myron F. Andrews, Chairman, Department of Veterinary Science

Kilbourn L. Janecek, Director of Libraries

I.A. Schipper, Professor of Veterinary Science

George E. Staples, Associate Professor of Veterinary Science

H. Donald Stockman, Vice President for Business and Finance

Kenneth E. Raschke, Commissioner, North Dakota State Board of Higher Education

Gary Reinke, Superintendent Physical Plant

THE UNIVERSITY OF SOUTH DAKOTA

Richard L. Bowen, President

Karl H. Wegner, Vice President for Health Affairs and Dean, School of Medicine

George C. Rinker, Associate Dean

Jack E. Mobley, Associate Dean, Clinical Sciences

Joseph R. Massa, Special Assistant to the President

Sidney Milburn, Director of Vivarium

Willard O. Read, Chairman, Department of Physiology and Pharmacology

Robert J. Peanasky, Professor of Biochemistry

SOUTH DAKOTA STATE UNIVERSITY

Hilton M. Briggs, President

Harold S. Bailey, Vice President for Academic Affairs and Dean of Graduate School

David E. Pearson, Vice President for Administration

Delwyn Dearborn, Dean, College of Agriculture and Biological Sciences

Burton L. Brage, Associate Dean of Agriculture and Biological Sciences

Raymond A. Moore, Director, Agricultural Experiment Station and Associate Dean, Graduate Faculty

Hollis D. Hull, Associate Dean, College of Agriculture and Director, Cooperative Extension Service

Mahlon W. Vorhies, Head, Department of Veterinary Science and Director, Diagnostic Laboratory

Martin E. Bergeland, Professor, Department of Veterinary Science

George Ruth, Associate Professor, Department of Veterinary Science

Charles DePoe, Director, Physical Plant

UNIVERSITY OF WYOMING

William D. Carlson, President

Conrad J. Kercher, Vice President for Academic Affairs

E. Gerald Meyer, Vice President for Research

Morris C. Jones, University Architect

Brinton L. Swift, Professor and Liaison Officer with the Study

Neil W. Hilston, Dean, College of Agriculture; Director, Agricultural Extension Service; and Director, Agricultural Experiment Station

Lloyd C. Ayres, Associate Dean; Associate Director, Agricultural Experiment Station

James O. Tucker, Head, Division of Microbiology and Veterinary Medicine

E. Lee Belden, Assistant Professor, Microbiology

Robert S. Cochran, Member, Academic Planning Committee

Robert B. Nelson, Associate Professor, School of Pharmacy

Glenn B. Mullens, Professor, Academic Planning Committee

Thomas R. Preston, Head, Department of English and Member, Academic Planning Committee

APPENDIX C

CRITERIA RATING SCALES

Rater's Appraisal Sheet

Criteria	Key Variables	Rating Scale			Data Source
General Campus					
1. The institution is easily accessible to the entire Region.	1. miles by auto from geographic center of OWR	1. 0 Low 400 miles or more	10 Med. 201 to 399 miles	20 High 200 miles or less	1. Map American Automobile Association
2. The institution has demonstrated its interest in having the proposed college.	2. studies have been performed or are underway; statements of leaders	2. 0 No -suggested other Univ. as location -reluctant to complete questionnaire or -letter from President or Chancellor expressed interest in cooperating with CVM but not in location of CVM		20 Yes -studies have been performed, or -leaders have expressed strong written and oral interest	2. List of actual or proposed studies Rating on site visit Letter from officials
3. There is an adequate supply of potential companion animal patients.	3. number in 10,000 sq. mile area around campus and within OWR	3. 0 Low dogs <20,000 cats <20,000 horses <15,000	10 Med. 20,001-99,999 20,001-99.999 15,001-39,999	20 High 100,000> 100,000> 40,000>	3. Questionnaire; Animal population by county in 10,000 sq. mile area around campus and within OWR. Calculated using ratio of human to dog and cat population, American Humane Society, Animal Control Survey, 1971, pp. 30, 31.
4. There is an adequate supply of potential food producing and zoo animal patients.	4. number in 10,000 sq. mile area around campus and within OWR	4. 0 Low beef cattle <300,000 Dairy cattle <40,000 Hogs <100,000	10 Med. 300,001-699,999 40,001-69.999 100,001-399,999	20 High 700,000> 70,000> 400,000>	4. Questionnaire U.S. Dept. of Agriculture Statistical Reporting Service, State Statistical Office "Crop and Livestock Statistics, Annual Summary 1974" "Animals Next Door, A Guide to Zoos and Aquariums of the Americas," 1971.

Rater's Appraisal Sheet

Page

Criteria	Key Variables	Rating Scale	Data Source
		sheep & goats <30,000 — 30,001-99,999 — 100,000> poultry <300,000 — 300,001-999,999 — 1,000,000> zoo animals <400 — 401-599 — 600 >	
5. There is an adequate supply of university owned land on campus that could be used for a college of veterinary medicine.	5. acres of land on campus to be assigned to CVM	5. 0 Low 20 or less acres 10 Med. 21-34 acres 20 High 35 or more acres	5. Questionnaire Site visit Campus Map
6. There is an adequate supply of university owned land that could be assigned to a CVM research farm.	6. number of acres which will be assigned to CVM	6. 0 Low less than 50 acres 10 Med. 50-149 acres 20 High over 150 or more acres	6. Questionnaire Site visit
7. There is an adequate supply of land adjacent to the campus available for purchase that could be used by a veterinary college.	7. acres available for purchase	7. 0 No low or medium rating for #5 or #6 and no land available for purchase 20 Yes land available for purchase or (no land available but supply of land in #5 or #6 was adequate)	7. Questionnaire Site visit
8. The general terrain of the area is suitable for the purpose of the new college.	8. elevation, drainage, tillable land	8. 0 Low low-swampy not tillable 10 Med. flat elevation and fairly tillable 20 High high drainage potential, high elevation, tillable	8. Topographical maps Rating during site

Criteria	Key Variables	Rating Scale	Data Source
9. The veterinary research farm will not be a nuisance to the surrounding area.	9. flies and odor a nuisance to the area	9. 0 No will create a problem 20 Yes will not create a problem	9. Air Weather Service, US Weather Bureau, US Dept. of Commerce Questionnaire Site visit
10. The institution is easily accessible to the entire Region by air.	10. distance to site from closest commercial airport	10. 0 Low over 20 mi 10 Med. 10-20 mi. 20 High less than 10 mi.	10. Questionnaire Site Visit
11. The housing is adequate for supplying the needs of the veterinary students.	11. number of units for students	11. 0 No The housing is inadequate (not enough provided by either private enterprise or the university). 10 Partial 20 Yes There is adequate housing provided by either private enterprise or the university.	11. Questionnaire Site visit
12. The proposed site is easily accessible by auto.	12. freeways and major federal and state highways	12. 0 No 20 Yes -some freeway or good highway nearby -little traffic congestion	12. Questionnaire Site visit
13. There is public transportation to and from the proposed site.	13. There is or is proposed public transportation.	13. 0 No not available 10 Walking 10 min. walking time from campus bldgs. 20 Yes inter-campus and other public transportation is available from housing to campus.	13. Questionnaire Site visit

Page

Criteria	Key Variables	Rating Scale	Data Source
14. The institution is far enough away from the existing veterinary colleges so that there would be no unnecessary overlap in functions.	14. The institution is far enough away from existing veterinary colleges.	14. 0 No institution is less than 100 miles away from closest existing veterinary college 20 Yes 100 miles distance from closest existing veterinary college	14. American Automobile Association
15. The existing library facilities can accomodate the veterinary medical students and faculty.	15. will assign adequate space and provide medical volumes and computer based services	15. 0 Low less than 25% of req'd space, volumes, and computer based services 10 Med. 25%-75% 20 High over 75%	15. Questionnaire Site visit
16. The institution has adequate support to accomodate veterinary medicine.	16. support services such as -computer -recreation -student health services -power plant	16. 0 Low 10 Med. 20 High	16. Interview question during site visit
17. There is a funded 4-year medical college affiliated with the university.	17. degree of affiliation with a 4 year funded medical college in the state demonstrated by significant joint programs	17. 0 No No joint programs 20 Yes joint programs are significant	17. The New American Guide to Colleges Bulletin of Institution Questionnaire
18. There is an existing agriculture college affiliated with the university.	18. existing agriculture school	18. 0 NO 20 Yes	18. The New American Guide to Colleges Bulletin of the Institution Questionnaire

Criteria	Key Variables	Rating Scale				Data Source
19. There is a college of pharmacy affiliated with the university	19. existence of pharmacy affiliation	19.	0 No		20 Yes	19. The New American Guide to Colleges Bulletin of the Institution Questionnaire
20. There is a college of dental medicine affiliated with the university	20. existence of college of dental medicine	20.	0 No		20 Yes	20. The New American Guide to Colleges Bulletin of the Institution Questionnaire
21. There is a division of Public Health or equivalent within the university.	21. existence of division of Public Health	21.	0 No		20 Yes	21. The New American Guide to Colleges Bulletin of the Institution Questionnaire
22. There is a division of Allied Health Sciences within the university.	22. number of programs in Allied Health Sciences	22.	0 No None	10 1 program	20 Yes 2 or more programs	22. The New American Guide to Colleges Bulletin of the Institution Questionnaires
23. There is legislative climate for support.	23. documentation of previous and current legislation on veterinary medicine in each state, and subjective opinion of University leaders	23.	0 Low subjective opinion poor	10 Med. subjective opinion good; no documentation	20 High subjective opinion good; documentation available	23. Legislative activity
24. There is support by veterinarians.	24. study on CVM by state vet. med. assoc. or opinion of veterinary leaders	24.	0 Low Less than enthusiastic; no initiative shown	10 Med. enthusiastic	20 High state veterinary medical associations involved in study re veterinary college	24. Interviews during site visit and prior studies by veterinarians

Criteria	Key Variables	Rating Scale			Data Source
25. There are other satellite facilities which could be used by the veterinary medical students. (examples: state health lab., animal diagnostic lab., federal or state or industrial biomedical research lab., meat packing plants.)	25. facilities (number and quality) in state but outside CVM site.	25. 0 Low 0-15	10 Med. 16-30	20 High over 30	25. Questionnaire (plus interview question on site visit

Rater's Appraisal Sheet

Page ____

Criteria	Key Variables	Rating Scale	Data Source
College of Agriculture			
1. The college has a veterinary science department or equivalent.	1. number of full time equivalent DVM faculty, number of total faculty	1. 0 Low below 5 DVM below 5 total 10 Med. 5-10 DVM 5-10 total 20 High over 10 DVM over 10 total	1. Questionnaire Guide to American Colleges College catalogues
2. There is a library or portions of a library assigned to veterinary science.	2. There is a library or portions of one assigned to veterinary science.	2. 0 No 20 Yes	2. Questionnaire
3. There is an agricultural library with space available for the addition of veterinary medicine.	3. There is or is not a separate agricultural library. (see item #15 for General Library).	3. 0 No 20 Yes	3. Questionnaire
4. The college has an agricultural experiment station.	4. existence of agricultural experiment station	4. 0 No 20 Yes	4. Questionnaire
5. The college has a veterinary extension program.	5. existence of veterinary extension program	5. 0 No 20 Yes	5. Questionnaire
6. The college has a continuing education program for veterinarians.	6. existence of continuing veterinary education program in fiscal 1975	6. 0 No 20 Yes	6. Questionnaire Interview question on the site
7. The college offers an animal technician training program.	7. existence of animal technician training program	7. 0 No 20 Yes	7. Questionnaire

Rater's Appraisal Sheet

Page

Criteria	Key Variables	Rating Scale	Data Source
8. The college has a division of laboratory animal resources to serve the entire university.	8. existence of division of laboratory animal resources	8. 0 No; 20 Yes	8. Questionnaire
9. There is an animal research farm affiliated with the university.	9. existence of animal farm	9. 0 No; 20 Yes	9. Questionnaire Site visit
10. There is an effective biomedical research program.	10. determined by number of FTE's of faculty and dollars expended in fiscal 1974	10. 0 Low 12 or less FTE $0-500,000; 10 Med. 12-20 FTE's 500,000-$1,000,000; 20 High over 20 FTE's over $1,000,000	10. Questionnaire

Criteria	Key Variables	Rating Scale			Data Source
Department of Veterinary Science					
11. The department offers a program in preveterinary medicine.	1. existence of program in preveterinary medicine	1. 0 No		20 Yes	1. Questionnaire
12. There is an existing M.S. program	2. existence of M.S. program.	2. 0 No		20 Yes	2. College catalogues Questionnaire
13. There is an existing Ph.D. program.	3. existence of Ph.D. program.	3. 0 No		20 Yes	3. College catalogues Questionnaire
14. There is an existing M.S. and Ph.D. program.	4. existence of an M.S. and Ph.D. Program.	4. 0 No		20 Yes	4. College catalogues Questionnaire
15. The department offers a residency program.	5. existence of residency program.	5. 0 No		20 Yes	5. Questionnaire
16. The department offers an internship program.	6. existence of internship program.	6. 0 No		20 Yes	6. Questionnaire
17. The department offers a residency and internship program.	7. existence of both a residency and internship program.	7. 0 No		20 Yes	7. Questionnaire
18. The department has access to a state diagnostic laboratory.	8. number of faculty (D.V.M. and Ph.D.) and expenditures per faculty person.	8. 0 Low 0-2 faculty $0-30,000	10 Med. 3-5 faculty $30,001 -60,000	20 High 6-8 faculty over $60,000	8. Questionnaire Site visit

Criteria	Key Variables	Rating Scale				Data Source
19. There is an effective extension program.	9. dollars expended in fiscal 1974.	9.	0 Low $0-20,000	10 Med. $20,001-40,000	20 High over $40,000	9. Questionnaire
20. There is an effective veterinary research program.	10. dollars budgeted in fiscal 1975.	10.	0 Low $0-150,000	10 Med. $150,000-300,000	20 High over $300,000	10. Questionnaire

APPENDIX D

DATA COMPILATION ON CANDIDATE UNIVERSITIES AND FINAL RATING

DATA COMPILATION
ON CANDIDATE UNVERSITIES AND FINAL RATINGS*

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
1. The institution is easily accessible to the entire Region.	Peripherally located in Region; 464 miles by auto from geographic center of OWR. (0)	Peripherally located in Region; 513 miles by auto from geographic center of OWR. (0)
2. The institution has demonstrated interest in having the proposed college	Letter from President McIntosh indicated interest. Dr. Richard E. Dierks, Head, Department of Veterinary Science, designated to serve as liaison with study. (90)	Letter from Chancellor Zumberge indicated interest. Dr. Howard Ottoson, acting Vice Chancellor for Agriculture and Natural Resources, designated to serve as liaison with study. (90)
3. There is an adequate supply of potential companion animal patients.	Dogs - 7,814 Cats - 5,745 Horses and mules - 17,030 (0)	Dogs - 146,713 Cats - 118,576 Horses and mules - 47,800 (234)
4. There is an adequate supply of potential food producing and zoo animal patients.	Beef cattle - 346,700 Dairy cattle - 6,100 Hogs - 16,000 Sheep and goats - 48,600 Poultry - 357,400 Zoo animals - none (84)	Beef cattle - 938,567 Dairy cattle - 77,638 Hogs - 577,700 Sheep and goats - 46,675 Poultry - 1,670,300 Zoo animal - 1,450 (462)

*Final ratings shown in parentheses. (The mean of the rating on each criterion times the weight.)

North Dakota State University Fargo	South Dakota State University Brookings	University of Wyoming Laramie
Peripherally located in Region; 504 miles by auto from geographic center of OWR. (0)	Peripherally located in Region; 364 miles by auto from geographic center of OWR. (38)	Peripherally located in Region; 320 miles by auto from geographic center of OWR. (38)
Letter from President Loftsgard indicated interest. Dr. Kenneth Gilles, Vice President for Agriculture, designated as liaison with study. (90)	President Briggs indicated interest. President Briggs served as liaison with study. (90)	Letter from President Carlson indicated interest. Dr. Brinton L. Swift, Prof. of Veterinary Medicine, designated to serve as liaison with study. Oct. 1974 - Report by A. M. Lee to the University Developmental Committee entitled 'The Establishment of a College of Veterinary Medicine at the University of Wyoming." (90)
Dogs - 33,291 Cats - 18,016 Horses and mules - 4,387 (39)	Dogs - 20,697 Cats - 11,200 Horses and mules - 9,694 (39)	Dogs - 10,863 Cats - 7,648 Horses and mules - 5,881 (0)
Beef cattle - 459,525 Dairy cattle - 21,275 Hogs - 127,100 Sheep and goats - 59,990 Poultry - 264,450 Zoo animals - none (126)	Beef cattle - 1,025,500 Dairy cattle - 54,970 Hogs - 571,050 Sheep and goats - 200,900 Poultry - 2,869,800 Zoo animals - 300 (378)	Beef cattle - 201,434 Dairy cattle - 1,020 Hogs - 5,450 Sheep and goats - 92,000 Poultry - 18,620 Zoo animals - none (42)

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
5. There is adequate university owned land on campus that could be used for a college of veterinary medicine.	40 acres adjacent to and north of Veterinary Research Lab. and part of 116 acres designated for Department of Veterinary Science will be assigned by University. Site is walking distance from relevant campus buildings and dorms. (76)	University will assign 40 acres adjacent to the Department of Veterinary Science and walking distance from other relevant campus buildings. (76)
6. There is adequate university owned land that could be assigned to a CVM research farm.	Will assign 80 acres for research farm adjacent to the CVM site and south of Department of Veterinary Science after this leased farm is purchased by University; or 460 acres (Huidekoper Ranch) located at Big Timber 60 miles east of Bozeman. (41)	Will assign 300 or more acres for research farm within 30 miles of campus. (82)
7. There is adequate land adjacent to the campus available for purchase that could be used by a veterinary college.	80 acres currently leased by University (Aaker Farm) is expected to be purchased by MSU. (86)	Adequate acreage of University owned land will be assigned. (86)
8. The general terrain of the area is suitable for the purposes of the new college.	40 acres CVM site; medium elevation, flat, well drained except for narrow central strip, tillable loam. 80 acres (Aaker farm) for research farm is optimal; purchase by MSU. (68)	40 acres on campus; medium elevation, gentle rolling, well drained, tillable loam. 300 acres or more research farm is optimal. (68)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
The University will assign a minimum of 35 acres located in section 36 and adjacent to the Department of Veterinary Science; walking distance from relevant campus buildings. (76)	University will assign 45 acres, walking distance from new library, the Department of Veterinary Science, Animal Disease Research and Diagnostic Laboratory, and other relevant campus buildings. (76)	University will assign 50 acres north of stadium and west of recreation and physical education area; walking distance from Division of Microbiology and Veterinary Medicine and other relevant campus buildings. (76)
Will assign 150 acres or more for research farm within 2 miles of campus. (82)	No; will assign 150 acres for research farm within 2 miles of campus; however CVM must purchase replacement land for University. (0)	Will assign 150 acres for research farm within 6 miles of campus in West Laramie. (82)
Adequate acreage of University owned land will be assigned. (86)	Yes; adequate acreage is available adjacent to the agricultural Experiment Station farms. (86)	Adequate acreage of University owned land will be assigned. (86)
Over 35 acres on campus; of medium elevation compared to sites of existing colleges on campus; flat, natural drainage, tillable loam. 150 acre research farm is optimal. (68)	45 acres of campus; medium elevation, flat, fair natural drainage, tillable loam, good elevation in relation to campus buildings. 150 acres research farm is optimal, but if used by CVM, replacement land must be purchased. (68)	50 acres on campus is high elevation, flat, well drained, rocky but will support landscaping. 150 acres research farm is optimal. (68)

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
9. The veterinary research farm will not be a nuisance to the surrounding area.	150 acres is currently pasture for cattle and hay production located northwest of the campus; research will not be a nuisance at this location. (72)	300 acres surrounded by beef cattle pasture, hay production, and other farm land. Well drained land used many decades for livestock farm so research will not be a nuisance at this location. (72)
10. The institution is easily accessible to the entire Region by air.	Gallatin Field served by Northwest Orient and Frontier Airlines is 10 minutes driving time, 8 miles from campus. (72)	Lincoln Airport served by United, Frontier, and Air Wisconsin Airlines is 15 minutes driving time, 7 miles from campus. (72)
11. The housing supply is adequate for the needs of the veterinary student.	Dormitories and apartments are adequate for single and married veterinary students. (54)	Approximately 500 dormitory spaces have been available during the past 2 years. Private housing is available for married students. (54)
12 The proposed site is easily accessible by auto.	Federal highways I-90 and I-94; US 10, 191, 289; Montana 345, 293. (92)	Federal highways I-80, US 6, 34, 77 and Nebraska 2. I-80 connects with I-29. (92)
13. There is public transportation to and from the proposed site.	No bus service but site is walking distance from dorms and other relevant campus buildings. (29)	No bus service but site is walking distance from dorms and other relevant campus buildings. (29)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
150 acre site is surrounded by farm land and is sufficiently removed from residential areas so as not to be a nuisance. Land used for cattle pasture for many decades without complaints from campus or city residents. (72)	150 acres bounded by Hwy. 14 by-pass on north, county road, and C&NW railroad on west and south and pasture land on the east; therefore, no odor or insect nuisance to residential or campus area. (72)	150 acres surrounded by beef pasture, hay production, and other farm land. Well drained land used many decades for livestock farm so research will not be a nuisance at this location. (72)
Fargo Municipal Airport is 5 minutes driving time, one mile from proposed site; served by North Central and Northwest Orient Airlines. (72)	Brookings Airport, served by North Central Airlines, is located 5 minutes driving time, 2 miles from campus. Sioux Falls Airport is 60 minutes driving time, 31 miles (Ozark, Western,and North Central Airlines). (72)	Brees Field served by Frontier Airline; driving time 10 minutes, 6 miles from campus. (72)
No, students must compete for limited existing private housing; university dorms for single and married students are filled. (0)	Yes, for single students. No, for married students unless private or university housing is built. (27)	University dormitories and apartments will accomodate all students in CVM; have vacancies currently. (54)
Federal highways I-94, I-29, US 10, 52, 75, and 81. (92)	Federal Highways I-90 and I-29, US 77 and 14. (92)	Federal highways I-80 and I-25. (92)
No bus transportation from Fargo or housing areas to campus; site is walking distance from campus buildings. (29)	No bus transportation from Brookings or housing area to campus; site is walking distance from campus buildings. (29)	No bus service but site is walking distance from dorms and other relevant campus buildings. (29)

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
14. Distance from nearest existing veterirary college mediates against unnecessay overlap in function.	497 miles from CVM, Pullman, Washington. (58)	134 miles from CVM, Manhattan, Kansas. (58)
15. The existing library facilities can accomodate the veterinary medical students and faculty.	50% of CVM library can be accomodated on 3rd and 4th floors of University General Library in conjunction with WAMI students; 312 WAMI volumes, 51 vet. med. volumes, and King. Co. Med. Soc., 30,000 volumes. No computer based services but University of Washington grant may support MEDLINE. (42)	Thompson Library will accommodate the CVM faculty and students and space for 20,000 veterinary medicine volumes. Periodicals indexed in Index Medicus currently number 493 titles in the Thompson Library and 607 titles at the Love Library; 80% of vet. med. journals indexed are received. The medical library from the city campus has been moved to the Thompson Library. Computer based services: HTIS, PANDEX, Educ., SSCI, CAIN and expect contract in 1975 for MARC, SCI, CICP, CHEM. Access to MEDLINE through University Medical Center. (84)
16. The institution has adequate support services to accommodate veterinary medicine.	Following Support Services: X Computer X Recreation X Student Health 0 Power Plant has borderline steam generating capacity and located 0.5 miles from CVM site. (258)	Following Support Services: X Computer X Recreation X Student Health X Power Plant - boiler capacity will serve CVM for 15-20 years and 6000 ton chiller capacity will serve the CVM indefinitely. (344)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
245 miles from CVM at St. Paul, Minnesota. (58)	211 miles from CVM at St. Paul, Minnesota. (58)	67 miles from CVM at Fort Collins, Colorado. (0)
Current library is overcrowded; no space can be assigned. Proposed new library is not funded. No medical library. Computer based services: MARC, SCI, NTIS, CAIN, Educ., CHEM. MEDLINE expected in future when medical students from UND-Grandforks arrive at Fargo. (0)	New general university library is under construction and can assign space to accommodate entire vet. med. library for 20 years. There is no medical library and small veterinary medicine holdings. Limited computer based services: SCI, SSCI, Educ. (42)	No sq. feet can be assigned to CVM. No computer based services. (0)
Following Support Services: X Computer X Recreation X Student Health 0 Power Plant is not adequate to add CVM. (258)	Following Support Services X Computer X Recreation X Student Health 0 Power Plant has little reserve in steam generation; no central chiller; future buildings will be heated electrically. (258)	Following Support Services: X Computer X Recreation X Student Health 0 Power Plant - addition to building in 1967 provided for expansion but extra steam generator was not installed. Current capacity is inadequate for CVM. Steam line will soon be installed to 50 acre campus site. (301)

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
17. There is funded 4-year medical school affiliated with the university and has joint programs with veterinary science department.	No; WAMI is shared curriculum with University of Washington School of Medicine with 20 freshman medical students at MSU. No joint programs between Vet. Science and Med. School. (0)	Yes; University of Nebraska Medical Center is located at Omaha, 55 miles from Lincoln campus. Joint graduate and research programs between Vet. Science and College of Medicine. (44)
18. There is an existing agriculture college affiliated with the university.	Yes (82)	Yes (82)
19. There is a school of pharmacy affiliated with the university.	No (0)	Yes; at Omaha, 55 miles (44)
20. There is a school of dental medicine affiliated with the university.	No (0)	Yes (30)
21. There is a division of public health or equivalent within the university.	No (0)	No (0)
22. There is a division of allied health sciences within the university.	Medical Technology; no other division.	Yes; at Omaha campus Medical Technology Radiation Therapy X-Ray Technology Physician's Assistant Audiology and Speech Pathology Biomedical Communications Nurse Anesthetist Physical Therapy Nuclear Medicine Technology

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
No, nearest existing medical college is 80 miles at University of North Dakota at Grand forks. Area Health Education Center located on campus. No joint programs between Vet. Science and School of Medicine (0)	No; nearest medical college is 108 miles at University of South Dakota at Vermillion. No joint programs between Vet. Science and School of Medicine. (0)	No; medical school has planning funds only. No joint programs between Vet. Science and Medical School. (0)
Yes (82)	Yes (82)	Yes (82)
Yes (44)	Yes (44)	Yes (44)
No (0)	No (0)	No (0)
No (0)	No (0)	No (0)
Medical Technology Animal Health Technician	Medical Technology No other divisions	Medical Technology No other divisions

General Campus Criteria	Montana State University Bozeman	University of Nebraska Lincoln
23. There is legislative climate for support.	Good (47)	Nebraska Legislature (Bill #375) authorized a college of Veterinary Medicine at the University of Nebraska-Lincoln on May 13, 1955; college has not been funded. On May 22, 1975, the eighty-fourth legislature of Nebraska passed Resolution No. 65 stating (1) the wish "that the regional veterinary school be placed on the University of Nebraska at Lincoln campus, or at one of its satellite stations" and (2) "that the legislature express its interest in extending whatever cooperation may be required to bring about this result." (94)
24. There is support by veterinarians.	Enthusiastic (34)	Yes; Nebraska Veterinary Medical Association assisted in a study: "Alternatives for Veterinary Medicine in Nebraska" published in 1974. (68)
25. There are other satellite facilities which could be used by the veterinary medical students. (example: Health lab, animal diagnostic lab, federal or state or industrial biomedical research lab, meat packing plants.)	31 facilities, see Appendix E. (76)	38 facilities, see Appendix E. (76)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
Excellent to good (47)	Good (47)	Good (47)
Enthusiastic (34)	Enthusiastic (34)	Moderate (0)
17 facilities, see Appendix E. (38)	17 facilities, see Appendix E. (38)	11 facilities, see Appendix E. (38)

College of Agriculture Criteria	Montana State University Bozeman	University of Nebraska Lincoln
1. The college has a veterinary science department or equivalent.	Yes 5.0 FTE, DVM faculty 9.9 FTE, non-DVM faculty 8.0 FTE, technical staff 2.5 FTE, office (132)	Yes 12.0 FTE, DVM faculty 4.0 FTE, non-DVM faculty 14.66 FTE, technical staff 4.0 FTE, office staff (176)
2. There is a library or portions of a library assigned to veterinary science.	Yes, 1500 sq. ft. and 0.5 FTE librarian 2000 bound volumes 1500 books 100 periodicals (74)	Yes; large medical and veterinary medical holdings in Thompson Library. (74)
3. There is an agricultural library with space available for the addition of veterinary medicine.	No separate agriculture library; agricultural and medical holdings are in general library which can accommodate 50% of vet. med. library. (0)	No separate agriculture library; agr., med., and vet. holdings are in Thompson Library - will be adequate for CVM. Adequate space is available for students and faculty as well as additions of veterinary medical volumes for next 20 years. Library is located 1.5 blocks from site assigned to CVM. (0)
4. The college has an agricultural experiment station which includes veterinary science.	Yes (92)	Yes (92)
5. The college has a veterinary extension program.	No (0)	Yes (76)
6. The college has a continuing education program for veterinarians.	No days in fiscal 1975. (0)	4.5 days in fiscal 1975. (80)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
Yes 9 FTE, DVM faculty 1 FTE, non-DVM faculty 16 FTE, technical staff 4 FTE office staff (132)	Yes 7 FTE, DVM faculty 7.5 FTE, non-DVM faculty 14 FTE, technical staff 5 FTE, office staff (132)	Yes 2 FTE, DVM faculty 10 FTE, non-DVM faculty 6 FTE, technical staff 2 FTE, office staff (88)
Yes, incorporated in general library. (74)	Yes (74)	Yes; holdings are in University Science Library. (74)
No separate agricultural library; incorporated into crowded general library. (0)	No separate library; 5000 net sq. ft. will be available for CVM in the new general library which is under construction and will open in 1978. (0)	No separate library; no space is available in main library for assignment to CVM. (0)
Yes (92)	Yes (92)	Yes (92)
No (0)	Yes (76)	No (0)
No days in fiscal 1975; prior years usually had 2-day short course. (0)	5 days in fiscal 1975. (80)	No days in fiscal 1975. (0)

College of Agriculture Criteria	Montana State University Bozeman	University of Nebraska Lincoln
7. The college offers an animal technician (veterinarian's assistant) training program.	No, but associate degree offered at Havre and a second program at Glendive. (0)	No, but accredited Animal Technology program is offered at University of Nebraska School of Technical Agriculture at Curtis, Nebraska. (0)
8. The college has a division of laboratory animal resources to serve the entire university.	No; resources administered by departments and coordinated by University committee. (0)	No; each department has own services. (0)
9. There is an animal research farm affiliated with the university.	Yes; at Bozeman and Big Timber. (88)	Yes; 9500 acre Mead Field Laboratory; 35,000 acre meat animal Research center. (88)
10. There is an effective biomedical research program.	Fiscal 1974: $1,414,693 expended 4.0 FTE, DVM faculty 22.0 FTE, Ph.D. faculty (160)	Fiscal 1974: $2,794,659 expended 6.8 FTE, DVM faculty 20.9 FTE, Ph.D. faculty (160)
Department of Veterinary Science 11. The department offers a program in pre-veterinary medicine.	Yes (84)	Yes (84)
12. There is an existing M.S. program for veterinarians.	Yes (58)	Yes (58)
13. There is an existing Ph.D. program for veterinarians.	Yes (54)	Yes (54)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
Yes, to begin fall 1976; 2 years duration. (30)	No (0)	No; but Eastern Wyoming Community College at Torrington offers program. (0)
No, each department provides own services. (0)	No, each department provides own services. (0)	No (0)
Yes, adjacent and NW of campus. (88)	Yes, adjacent and NW of campus. (88)	Yes, southwest and west of campus; over 4000 acres. (88)
Fiscal 1974: $967,478 expended 6.0 FTE, DVM faculty 10.5 FTE, Ph.D. (80)	Fiscal 1974: $668,362 expended 1.3 FTE, DVM faculty 8.5 FTE, Ph.D. faculty (40)	Fiscal 1974: $426,381 0.64 DVM faculty 13.5 Ph.D. faculty (40)
Yes (84)	Yes (84)	Yes (84)
No (0)	No (0)	Yes (58)
No (0)	No (0)	No (0)

College of Agriculture Criteria	Montana State University Bozeman	University of Nebraska Lincoln
14. There is an existing M.S. and Ph.D. program	Yes (66)	Yes (66)
15. The department offers a residency program.	No (0)	No (0)
16. The department offers an internship program.	No (0)	No (0)
17. The department offers a residency and internship program.	No (0)	No (0)
18. The department has access to a diagnostic laboratory.	Fiscal 1974: $153,654 expended 3.0 DVM 13.0 technical Diagnostic laboratory administered by Montana Livestock Sanitary Board (100)	$294,708 expended in fiscal 1974 2.75 DVM 1.0 Ph.D. 5.2 technical (150)
19. There is an effective extension program.	No budget (0)	$129,871 expended in fiscal 1974 (84)
20. There is an effective veterinary research program.	Fiscal 1975: $311,776 budgeted FTE: 12.4 professional 9.9 clerical, technical (92)	Fiscal 1975: $642,931 budgeted FTE: 10.11 professional 11.17 clerical, technical (92)

N. Dakota State University Fargo	S. Dakota State University Brookings	University of Wyoming Laramie
No (0)	No (0)	No (0)
No (0)	No (0)	No (0)
No (0)	No (0)	No (0)
No (0)	No (0)	No (0)
$140,000 expended in fiscal 1974 3.0 DVM 1.0 Ph.D. 9.2 technical (100)	$327,380 expended in fiscal 1974. 5.0 DVM 2.0 Ph.D. 20.0 technical (150)	Wyoming State Vet. Lab. administered by the State Dept. of Agriculture. $86,008 expended in fiscal 1974 2.0 DVM 0.0 Ph.D. 4.0 technical (50)
No budget. (0)	$24,000 expended in fiscal 1974. (42)	No (0)
Fiscal 1975: $128,685 budgeted FTE: 1.65 professional 7.75 clerical, technical (0)	Fiscal 1975: $134,358 budgeted FTE personnel: 3.58 professional 3.20 clerical, technical (0)	Fiscal 1975: $196,386 budgeted FTE personnel: 4.54 professional 3.9 clerical, technical (46)

APPENDIX E

SATELLITE FACILITIES

MONTANA STATE UNIVERSITY

	Name	Location
Private research laboratory	Steel Diagnostic Services	Bozeman, Montana
University labs for research and education	Microbiology, Biology, Plant Pathology, Chemistry, Fish and Wildlife, Biochemistry	Bozeman, Montana
State and/or federal biomedical research laboratory	Rocky Mountain Laboratory	Hamilton, Montana
	State Diagnostic Laboratory	Bozeman, Montana
	Federal Grasshopper Laboratory	Bozeman, Montana
	U. S. Animal and Range Center	Miles City, Montana
Nutrition laboratory	Animal Science Research Center	Bozeman, Montana
Department of Health laboratory	State Health Laboratory	Helena, Montana
Meat packing plant	Midland Empire Packing Company	Billings, Montana
	Pierce Packing Company	Billings, Montana
	Miles City Packing Company	Miles City, Montana
	Miles City Packing Company	Butte, Montana
	Daily Packing	Missoula, Montana
	Robert Packing Company	Dillon, Montana
Agriculture research and development center	Field Stations	Huntley, Havre, Moccasin, Kalispell, Montana
Marine animal laboratory	Fish and Wildlife Service	Yellowstone Park, Montana
	Fish Hatchery	Bozeman, Montana
Environmental health laboratory	Water Resources Laboratory	Bozeman, Montana
	Coal Reclamation Group	Helena, Montana

	Name	Location
State and/or federal livestock farm	Veterinary Research Laboratory Farm	Big Timber, Montana
Medical schools	MSU Nursing School	Bozeman, Montana
	Medical Technology in Dept. of Microbiology	Bozeman, Montana

UNIVERSITY OF NEBRASKA

	Name	Location
Private research laboratory	Harris Laboratories	Lincoln, Nebraska
University labs for research and education	Veterinary Diagnostic Laboratory, Biochemistry, Home Econmics and Nutrition, Meat Research, Wildlife	Lincoln, Nebraska
State and/or federal biomedical research laboratory	State Animal Laboratory	Lincoln, Nebraska
	Animal Health Service	Lincoln, Nebraska
Pharmaceutical laboratory	Norden Laboratories	Lincoln, Nebraska
	Burns - Biotech	Omaha, Nebraska
	Dellen Biological Laboratories	Omaha, Nebraska
Department of Health laboratory	State Public Health Laboratory	Lincoln, Nebraska
Meat packing plant	Horse Packing Plant	North Platte, Nebraska
	Iowa Beef	West Point, Nebraska
	Farmland Industries	Crete, Nebraska
	Iowa Beef	South Sioux City, Nebraska
	Sunflower Beef Packing	York, Nebraska
	Madison Packing	Madison, Nebraska
	York Packing	York, Nebraska
	American Stores	Lincoln, Nebraska
	American Beef	Omaha, Nebraska
	Wilson & Co., Inc	Omaha, Nebraska
	George A Hormel Co.	Fremont, Nebraska
Agriculture research and development center	U.S. Meat Animal Research Center	Clay City, Nebraska
State and/or federal livestock farm	Univ. of Nebraska Field Laboratory	Mead, Nebraska
	Sandhills Agriculture Laboratory	Tryon, Nebraska
	Panhandle Station	Scottsbluff, Nebraska
	Box Butte Experiment Station	Hemmingsford, Nebraska

	Name	Location
	School of Technical Agriculture	Curtis, Nebraska
	North Platte Experiment Station	North Platte, Nebraska
	Northeast Station	Concord, Nebraska
Diagnostic laboratories	Wren Pathology Service	Ralston, Nebraska
	North Platte Diagnostic Laboratory	North Platte, Nebraska
Medical schools	College of Medicine, University of Nebraska	Omaha, Nebraska
	Creighton Medical School	Omaha, Nebraska
	Dental College, University of Nebraska	Lincoln, Nebraska
	College of Pharmacy, University of Nebraska	Omaha, Nebraska
	Eppley Research Institute	Omaha, Nebraska

NORTH DAKOTA STATE UNIVERSITY

	Name	Location
State and/or federal biomedical research laboratory	USDA Metabolism Radiation Laboratory	Fargo, North Dakota
Department of Health laboratory	State Public Health Laboratory	Grand Forks, North Dakota
Meat packing plant	Fargo Packing and Sausage Company	West Fargo, North Dakota
	Flavorland Industries	West Fargo, North Dakota
Agriculture research and development center	Main Agricultural Experiment Station (all livestock)	Fargo, North Dakota
	Branch Experiment Station (cattle and range)	Dickinson, North Dakota
	Branch Experiment Station (sheep)	Hettinger, North Dakota
	Branch Experiment Station (irrigation and beef)	Carrington, North Dakota
Toxicology laboratory	State Toxicology Laboratory	Fargo, North Dakota
Environmental health laboratory	State Health Department	Bismarck, North Dakota
State and/or federal livestock farm	Northern Great Plains Agricultural Research Center, USDA (forage and cattle)	Mandan, North Dakota
Diagnostic laboratories	State Veterinary Diagnostic Laboratory (on NDSU campus)	Fargo, North Dakota
Medical schools	Medical School, Univ. of North Dakota	Grand Forks, North Dakota
	Fourth year medical students utilize four local hospitals for area health training program	Fargo, North Dakota

	Name	Location
Wildlife research	Northern Prairie Wildlife Research Station (federal)	Jamestown, North Dakota
Stockyards	Union Stockyard (feeder and slaughter)	West Fargo, North Dakota
Zoo	North Dakota State Zoo	Bismarck, North Dakota

SOUTH DAKOTA STATE UNIVERSITY

	Name	Location
University labs for research and education	Biochemistry, Home Economics and Nutrition, Microbiology, Biology, Animal Science, Pharmacy, Engineering, Wildlife	Brookings, South Dakota
Nutrition laboratory	GTA Feed Company	Sioux Falls, South Dakota
	ZIP Feed Company	Sioux Falls, South Dakota
	Golden Sun Feed Company	Sioux Falls, South Dakota
Department of Health laboratory	State Health Center	Pierre, South Dakota
Meat packing plant	Hormels	Mitchell, South Dakota
	Morrells	Sioux Falls, South Dakota
	Meilmans	Sioux Falls, South Dakota
	Armour	Huron, South Dakota
Medical schools	University of South Dakota Medical School	Vermillion, South Dakota

UNIVERSITY OF WYOMING

	Name	Location
University labs for research and education	Animal Science Farm Bioengineering	West Laramie, Wyoming Laramie, Wyoming
State and/or federal biomedical research laboratory	Star Wildlife Disease Research	Sybille Canyon, Wyoming
Department of Health laboratory	Wyoming Department of Public Health	Cheyenne, Wyoming
Meat packing plant	Slaughter Houses	Laramie and Cheyenne, Wyoming
Toxicology laboratory	Wyoming Department of Agriculture Laboratory	Laramie, Wyoming
Marine animal laboratory	Department of Zoology University of Wyoming	Laramie, Wyoming
	State Fish Hatcheries	Various locations, Wyoming
	U.S. Fish Hatchery	Jackson, Wyoming
Diagnostic laboratories	Wyoming State Veterinary Laboratory	West Laramie, Wyoming

APPENDIX F

HEALTH EDUCATION NETWORK USERS GROUP (HENUG) OF THE ASSOCIATION FOR DEVELOPMENT OF COMPUTER BASED INSTRUCTIONAL SYSTEMS

Updated July 22, 1975

HEALTH EDUCATION NETWORK USERS GROUP (HENUG) OF THE ASSOCIATION FOR DEVELOPMENT OF COMPUTER BASED INSTRUCTIONAL SYSTEMS

		ACCESSING		
	INSTITUTION	Massachusetts General Hospital	Ohio State University College of Medicine	HENUG VALIDATION DATE
1.	Community Hospital of the Monterey Peninsula, CA	Yes	No	MGH 5/23/75
2.	University of California Medical Center-Dept. of Anesthesiology	Yes	Yes	OSU 5/23/75 MGH 6/30/75
3.	University of Washington School of Medicine	Yes	Yes	MGH 5/23/75 OSU 5/23/75
4.	Southern Illinois University School of Medicine	Yes	Yes	MGH 5/23/75 OSU 5/23/75
5.	University of California, Los Angeles	Yes	Yes	MGH 5/23/75 OSU 5/30/75
6.	Columbia University Medical Center-Health Sci. Library	Yes	Yes	MGH 5/23/75 OSU 5/23/75
7.	American Academy of Orthopaedic Surgeons, IL	Yes	No	MGH 5/23/75
8.	University of Colorado Medical Center	Yes	Yes	MGH 6/30/75 OSU 5/23/75
9.	Hahnemann Medical College, PA	Yes	Yes	MGH 5/26/75 OSU 5/23/75

	ACCESSING		
INSTITUTION	Massachusetts General Hospital	Ohio State University College of Medicine	HENUG VALIDATION DATE
10. Harvard University-Countway	No	Yes	OSU 5/23/75
11. University of Maryland School of Medicine	Yes	Yes	MGH 5/30/75 OSU 5/23/75
12. University of Pennsylvania School of Medicine Library	Yes	Yes	MGH 5/30/75 OSU 5/23/75
13. Graduate Hospital of the University of Pennsylvania	Yes	Yes	MGH 6/3/75 OSU 5/23/75
14. University of Pittsburgh Eye and Ear Hospital	No	Yes	OSU 5/23/75
15. Texas College of Osteopathic Medicine	Yes	Yes	MGH 6/30/75 OSU 5/23/75
16. Medical College of Wisconsin	No	Yes	OSU 5/23/75
17. Medical College of Pennsylvania	Yes	Yes	MGH 5/26/75 OSU 5/28/75
18. Albany Medical College	Yes	Yes	MGH 5/26/75 OSU 5/28/75
19. Washington Hospital Center	Yes	Yes	MGH 5/26/75 OSU 5/28/75
20. SUNY Downstate	Yes	No	MGH 5/26/75
21. UCONN Health Center	Yes	Yes	MGH 5/26/75 OSU 5/28/75

	ACCESSING		
INSTITUTION	Massachusetts General Hospital	Onio State University College of Medicine	HENUG VALIDATION DATE
22. Bronson Methodist Hospital, MI	Yes	No	MGH 5/26/75
23. West Virginia University Medical Center	Yes	Yes	MGH 6/18/75 OSU 5/29/75
24. University of Alabama	Yes	Yes	MGH 6/13/75 OSU 5/29/75
25. University of Oregon Health Sciences Center	No	Yes	OSU 5/29/75
26. University of the Pacific Medical Center, CA	No	Yes	OSU 5/29/75
27. George Washington University, D.C.	Yes	Yes	MGH 6/3/75 OSU 5/29/75
28. Medical University of South Carolina	Yes	Yes	MGH 5/30/75 OSU 5/29/75
29. University of Utah Eccles Med. Sci. Library	No	Yes	OSU 5/29/75
30. Michigan State University	No	Yes	OSU 5/30/75 & 6/4/75
31. Washington University School of Med. Library	Yes	Yes	MGH 6/16/75 OSU 5/30/75
32. Onio State University	Yes	Yes	MGH 5/30/75 OSU 5/30/75
33. Mass. General Hospital, MA	Yes	Yes	MGH 5/30/75 OSU 5/30/75

	INSTITUTION	ACCESSING		HENUG VALIDATION DATE
		Massachusetts General Hospital	Ohio State University College of Medicine	
34.	New York Med. College	No	Yes	OSU 5/30/75
35.	University of Nebraska Medical Center	No	Yes	OSU 6/3/75
36.	Fort Worth Osteopathic Hospital, TX	No	Yes	OSU 6/5/75
37.	HENUG, CT	Yes	No	MGH 6/5/75 OSU 6/5/75
38.	V.A. Hospital, MI	Yes	Yes	MGH 6/16/75 OSU 6/9/75
39.	New Jersey College of Med. & Dentistry	Yes	Yes	MGH 6/13/75 OSU 6/11/75
40.	American Medical Systems, CA	No	Yes	OSU 6/11/75
41.	SUNY Buffalo, NY	Yes	Yes	MGH 6/16/75 OSU 6/11/75
42.	Johns Hopkins University, MD	Yes	Yes	MGH 6/18/75 OSU 6/23/75
43.	The Rand Corp., CA	Yes	No	MGH 6/18/75
44.	University of Pittsburgh, PA	Yes	Yes	MGH 6/18/75 OSU 6/24/75
45.	Arizona Medical Center U. of Arizona	Yes	Yes	MGH 6/23/75 OSU 7/22/75

	ACCESSING		
INSTITUTION	Massachusetts General Hospital	Ohio State University College of Medicine	HENUG VALIDATION DATE
46. University of California at Davis	Yes	No	MGH 6/27/75
47. New England Deaconess, MA	Yes	No	MGH 7/8/75
48. Tufts University, MA	Yes	No	MGH 7/8/75

APPENDIX G

SURVEY FORM: CONSTRUCTION COSTS OF VETERINARY MEDICAL BUILDINGS IN THE OLD WEST REGION AND IN STATES CONTIGUOUS TO THE REGION

ESTIMATED FACILITY BUDGET

Building identification: ______________________

____

B. Budget Line	New Construction
1. Building Work a. General construction b. Plumbing c. Heating, air conditioning, ventilation d. Electrical work e. Elevators f. Other building work g. TOTAL FOR BUILDING WORK	$
2. Site Work a. Site preparation b. Site development and parking c. Utility connecting lines d. Special use items e. TOTAL FOR SITE WORK	
3. Off-Site Work a. Connecting lines to central utility b. Other items c. TOTAL OFF-SITE WORK 4. Central Utility Plant	
5. TOTAL CONSTRUCTION COSTS	$

B. Budget Line	New Construction
6. Built-in Equipment 7. Architectural and Engineering Costs a. Architect's basic fee b. Supervision and inspection c. Surveys, tests, and borings d. Other items e. TOTAL ARCHITECTURAL AND ENGINEERING COST	$
8. Movable Equipment	$
9. TOTAL COST FOR CONSTRUCTION FIXED EQUIP. A/E FEES AND MOVABLE EQUIPMENT	$
10. Contingency %	
11. Purchase of Land	
12. Purchase of Buildings	
13. *Other*	
14. Subtotal - Lines 9 to 13 incl.	
15. Works of Art	
16. TOTAL DEVELOPMENT COST	$
A. Cost Estimate for What Date?	________
B. Gross area in facility	________ Gross Square Feet
C. Net area in facility	________ Net Square Feet

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